Medical Times

A Monthly Journal of Medicine, Surgery and the Collateral Sciences

Published by THE MEDICAL TIMES COMPANY at 95 Nassau Street

VOL. LI., No. 7 NEW YORK, JULY, 1923 Twenty Cents a Copy Two Dollars a Year

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Established 1871 Entered at the New York Post Office as Second Class Matter

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Vol. LI., No. 7 — New York, July, 1923 — Twenty Cents a Copy, Two Dollars a Year

Ophthalmic Aspects of Focal Infection

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In outlining our *present* understanding of the general question of focal infection it is well to keep in mind that though Billings, Rosenow and a score of others are apparently the *initiators* of the movement, quite a definite and clear comprehension of its principles had been arrived at over a *hundred years ago* by Benjamin Rush[1] (1819) and perhaps equally as well, a hundred years earlier by Jean Louis Petit.[2]

In discussing the pathological phases of the study, a surprising tendency is noted for writers to speak only of *dissemination of the actual organism* from the primary focus to the tissue of "selective localization." Little attention is directed to dissemination of *diffusible toxins*.

This is perhaps due to the tremendous influence of Rosenow's wonderful work and definite advance in experimentation on the selective action of streptococci. Without doubt however, it is only fair to say this field represents the most prolific pathogenic material. For, despite contrary views by Riesman,[3] as Ludvig Hektoen[4] has recently pointed out, the streptococci are the most frequent cause of oral and sinus disease and the rheumatic syndrome and are definitely factors in the exanthemata, polyomyelitis, influenza, etc., etc.

In ophthalmology we meet conditions quite frequently arising from the dissemination of diffusible toxins—as a concrete example, the diptheretic palsies of the ocular muscles (see paper with extensive bibliography by Lombardo[5]). Dweyer[12] has dilated upon the action of toxins originating in the intestinal tract, and our most valuable studies have been made by Allan Woods[6] and J. L. Stoddard.

The routes of ocular involvement as pointed out by Ring may be—

1. By continuity.
2. By way of the blood vessels.
3. By way of the lymphatics.
4. By way of the lymphatic sheaths of the nerves.

[17]Attempts have been made to show the relation of ocular disease to foci on the same side as the affected eye.

Definite conclusions are unwarranted, however, as it would be necessary to prove that surgical treatment of such a foci had not produced the results by auto-vaccination, etc., thus combating the influence of other foci or systemic disease.

An explanation is frequently sought for the *selective action* of the organism or toxic agent. The question is a most difficult one to decide and, without doubt, many and diverse factors are concerned. The *open receptors* of a biochemical sidechain probably explain the combination in certain instances both in the destruction and repair of the part.[10] Many[35] authorities may be quoted to show the existence or development of certain *strains of organisms* (note the more recent work on the spiroceta[7] palada, pneumococci,[8] but more particularly streptococci)[9] which find more suitable environmental conditions in some tissues than in others. In his elaborate experiments, Rosenow[11] has, perhaps, used hundreds of animals. In them he was able to reproduce the identical lesion in the identical organ from which the streptococci were originally cultured and this could be repeated many times though passed through a number of hosts. Irons[2] thinks the *oxygen tension* of a structure determines this to a great extent. He[12] has demonstrated that killed streptococci localize in the elective tissues as do living ones so that the affinity seems entirely biochemical. Ralph Pemberton[13] brings out many interesting points to help answer the question, not the least of which are a lowered sugar tolerance and inter-current disease.

Though it has been said that 80 per cent of all human ills originate above the clavicle we must not forget the frequent pathogenic *processes in organs more distant* from the region of the special sense organs. Suppurative diseases of the *respiratory organs* have been shown to be responsible.[14]

[15]Dweyer has dilated on the intestinal factor and has been assiduously championed by Bell.[16] Appendicitis,[17] gallbladder disease, renal infections and even cisticercus[18] infection must be considered. Frequent *gonorrhoeal endogenous* disease has been demonstrated in both recent and old prostatic and urethral infection. Uveitis of vaginal origin has been discussed, and finally, *superficial infections* of the extremities may be a cause.

Many cases of iritis and choroiditis clear up under local and symptomatic treatment and we are only too prone to feel that our work is done. It is unforgivable, however, if we do not exert ourselves in every possible way to ferret out or see that the patient is in the hands of an internist who will *ferret out* the actual *etiological factors*. As a detective running down clues, we must cultivate an aptitude for selecting the most likely one first, particularly as haste is often an essential.

To the *first decade of life* belong the tonsils as the most frequent seat of focal disease. The *second decade* takes on the nasal accessory sinuses and *later* the teeth play their role.

Relatively little interest in the *tonsils* as a factor in the production of ophthalmic pathology has manifested itself as compared to that shown for sinusitis and dental foci. The case reports are few and far between and practically no statistical data is available. Considerable generalized statements can be found and the second "T" of Bell's[16] slogan refers to tonsils. The point that iritis is so rare in childhood may be related to their relatively healthy teeth and to the possibility that tonsilar[19 20] disease is lower on the list when associated with ocular manifestations. (See the report of frequency in Davis's 100 cases—most obvious when pure dental and pure tonsilar cases are compared). Perhaps also the heavy percentages of corneal disease as shown for childhood by the tables of Magnus[21] and more recently by those of Bishop Harman[22] would be found to be related to tonsilar infection, could satisfactory studies be made. In fact,[23] this cause has been cited for phlyctenular keratitis.

[24]A great deal has been said of late on the influence of *gingivitis, pyorrhea, abscessed and decayed teeth* and their relation to focal disease. We[25] have all seen almost dramatic effects produced on an iritis by the removal of infected teeth and, likewise, we have all been sadly disappointed after the removal of supposedly offending processes. Like the dentists, we are too apt to accept some röntgenogram interpretation as the last word, not realizing that it should never be accepted as a diagnosis without other corroborative evidence any more than we would accept a rapid pulse as evidence of heart disease. We should demand a *thorough physical* investigation of the teeth by every means known to the art and science of dentistry before we draw conclusions. It should be our privilege as specialists to demand certain concessions from the dentists. When the physical or functional integrity of an *eye* is at stake it is often advisable to regard even a suspicious area as an absolute danger. Who of us would ask to save one tooth or even all teeth when it might cost us an eye? And suppose, moreover, the other eye be deficient—a point the dentist *cannot* know and *must* not guess at. The[26] *quantitative aspects* of the subject are very interesting. As[27] repeatedly shown, the area destroyed or the amount of pus does not measure the danger to the subject nor again the deep seatedness of the process. *We have all seen a simple small cavity prove to be the etiological factor and again seen failure when an abscess was drained. **We have always to watch ourselves lest our enthusiasm cause us to over shoot the mark. Too many foci opened at one time may flood the system with toxic products and give rise to the very disease we wish to guard against.

In speaking of the role played by *nasal accessory sinus disease* in relation to[28] ophthalmology,[29] we at once visualize[30] cases of retro-bulbar*** neuritis and papillitis. Perhaps this is because of the elaborate work of Sluder,[31] White,[32], [33]Cushing and many others. [34] Without attempting to clarify the problem as variously presented by these workers we must admit the definite relation of sinus infection to optic nerve lesions without losing sight of the fact that other structures besides the nerve elements may be effected.

There is much to be said under the heading of *therapy*. Removal of the *causative factors* is the modern cry of Hippocrates and yet that does not say all. We should help to unravel the tangle of explanation of how the pathogenic material passes from the *primary to the elective site* or how it acts *indirectly*. We do not even know how it is that opening a non-pus containing sinus relieves a papilloedema and yet it surely does. Every author takes a different view. The *vaccines* help sometimes and also parenteral injection of *foreign protein* has been reported on favorably. We, as specialists, too frequently fail to use the salicylates in accordance with modern views in combating streptococcus infection. The use of the ductless gland extracts is advocated, particularly thyroid extract. All of these are supposed to act on the causative agent and their action has been studied by the country's best workers.

Conclusions:

We conclude such a summary perhaps with the feeling that we know nothing after all of the relation of ophthmology to focal infections. That would be unfair, however. We can draw out certain *definite* and *usable facts*.

1. The most frequent ocular complications of nasal accessory sinus disease is involvement of the optic nerve.
2. The most frequent ocular complication of dental foci of infection is uveitis.
3. The most frequent ocular complication of tonsilar disease is probably keratitis.
4. A definite demand for radical removal of a focus is justifiable.
5. The whole problem is not speculative but is very real as shown by positive satisfactory results.
6. The most frequent etiological organism is the streptococcus and its selective localization is probably due to biochemical affinity made possible by the predisposition of the host.

*

SUMMARY OF CASE OF MRS. F. H.

Age 27. Complains of redness and pain in the right eye for the past ten weeks.

Family History is negative.

Past Personal History: Measles and scarlet fever as a child. One year ago finished the last of two series of Salvarsan for an acquired lues.

Has had two negative blood Wassermans and one negative spinal Wasserman since then.

There is no history indicating focal infection or gastro-intestinal disturbances.

There is a low grade subacute iritis in the right eye. There are no deposits on the posterior surface of the cornea. The aqueous is very slightly turbid. The pupil is 3 millimeters in diameter and slightly irregular. The iris vessels are barely visible. The iris markings are not materially obscured. On dilatation there are a number of small posterior synechia and one large one above and temporally. There are one or two islands of iris pigment on

NOTE.—Asterisks refer to corresponding typical cases appended.

the anterior surface of the lens adjacent to the edge of the pupils. There is a faint suggestion of a very fine lacey reticulum on the anterior capsule. There is no evidence of lens change. The vitreous shows no abnormal changes, and beyond a slight venous engorgement there is no suggestion of fundus pathology.

The left eye shows no pathological changes whatever.

O. D. V. 6/15. O. S. V. 6/6—3.

Installations of 1 per cent. atropine, three times a day, were ordered. A physical examination, with particular reference to focal infection and pelvic disease, accompanied by a blood Wasserman and urinalysis and complement fixation test for gonorrhea, were ordered. These examinations gave no positive findings whatever, and there was no indication that the process might be tubercular.

Nose and Throat Examination, with X-Ray of head, gave no suggestion of nasal accessory sinus disease.

Dental Examination and X-Ray gave no findings beyond a pin head shallow cavity in the upper right first molar.

Subsequent Course and Treatment: Patient was asked to have the dental condition eradicated. Mixed treatment was started, in spite of negative findings for lues, and the usual routine treatment for iritis of a specific etiology was instituted. During the next eight weeks there was no marked variation in the condition other than slight exacerbations and remissions. It was then discovered that the patient had not had the cavity in the tooth treated. This was immediately attended to. The cavity was cleaned of all unhealthy tissue and within 48 hours injection all inflammatory reaction had markedly subsided, and the iris was more fully dilated than ever before, and the synechia entirely broken away. Within the next three days all active signs subsided; vision returned to normal and all treatment was discontinued, with the idea of exciting any evidence of iritis which might reappear with the functioning of the eye.

Communication with the dentist two weeks after the patient was discharged, brought up an interesting point. The cavity had never been filled; that after the eye had cleared up the patient had not returned to have the filling put in, preparation of the cavity for the filling being the only measures taken. Two months after this the patient reappeared for refraction. The cavity was still tunfilled but seemed to show no evidence of decay on superficial examination. There had been not even the slightest evidence of recurrence of the iritis.

The refractive error proved to be a low grade of simple hyperopia in each eye.

It is realized that the lues may have been the predisposing cause, but the exciting cause certainly seems to have been the cavity.

It is now over two and one-half years since the attack and there has been no recurrence.

**

SUMMARY OF CASE OF MR. W. B.

Age 52. Occupation, bank clerk. Color, white.

Family History: Nothing of relation to present trouble.

Past Personal: Numerous attacks of renal colic during past ten years.

Excematous eruptions on body and face during last five years.

Three teeth with infected apices extracted three weeks ago.

No other pertinent history.

Vision: Far and near—good with correction.

General Physical Examination: Including blood pressure, blood Wasserman and urinalysis—negative.

Eye Examination: Shows no positive findings other than a slight injection of superficial conjunctival vessels of the left eye.

O. D. V. 6/6. O. S. V. 6/6.

Media clear and fundus normal in both eyes.

There was no change in the next few days except photophobia and lachrymation appeared in the left eye only, on examination. There were one or two highly refractive excrescences, like a grain of moist sugar, above the limbus, temporally. During the next two days the pupil dilated slightly and patient complained of a dull aching in the eye ball. The iris vessels seemed engorged, but there were no signs of exudate or definite inflammatory changes. Hot applications and four grain atropine every three hours prescribed, also catharsis and salicylate of soda.

At about the tenth day, the cornea showed a uniform, even clouding in its posterior surface, and the iris markings were less distinct. The pupil had dilated slightly, and was round, but a single speck of iris pigment was found on the lens capsule with the loupe. The patient complained of severe pain through the eyeball and the temporal region. Morphine was given without effect. The deeper vessels about the cornea had become markedly engorged. There was no increase of tension. This condition pertained during the next week, then the active symptons began to subside. There was less pain and the pupil had fully dilated. A typical pyramidal shaped collection of leucocytes and fibrin, appearing as disc shaped white dots, graded in size, were found on the posterior surface of the cornea. They gradually became cream colored and finally brownish in color, the larger ones at the base of the pyramid being the first to change. Retrogression was complete in about four weeks after the first examination. The atropine was discontinued and the patient was allowed to return to his business (wearing an Amber B with his correction ground in it).

O. D. V. 6/6 accepts no correction. O. D. J. = No. 8 w + 2.50 = No. 1.

O. S. V. 6/9 w — .50 × 90 = 6/6.

O. S. J. = No. 10 w + .50 × 90 = + 3.25 S = No. 1.

O. D. Amp. = 13 in. O. S. Amp. = 8 in.

***

SUMMARY OF CASE OF MR. J. C.

Age 41. Restaurant keeper. Born in Ireland. White and married.

April 26, 1922.

Chief Complaint: Blurred vision for near work, both eyes.

Past Personal: Previous general history is of no significance other than that he has been subject to numerous "head colds" all his life

Present Eye History: Negative.

His vision and ocular tissues showed no abnormal changes at an examination one year ago.

January 9, 1923.

Present History: While reading five days ago his vision became suddenly blurred in left eye and has persistently remained so. There seems to be a blurring at the center of any object looked at.

External Examination of Eye shows nothing pathological.

Tension—normal, no tenderness.

Anterior chamber—normal. { Light { Direct consensual

Pupils—equal, reaction—normal. { accommodation

Iris—no evidence of disease.

Lens—peculiar macula like spot (at 90) above—far forward O. S. only.

Vitreous—few relatively large floating opacities, O. S. only.

Fundus:

Macula—striate hemorrhage occupies this region, no exudate. O. S. only.

Papilla—severe swelling of nerve in O. S. (less than one millimeter). None O. D.

Periphery—O. S. severe retinal oedema with many striate hemorrhages. O. D. none.

Vessels—O. S. severe engorgement of veins, narrow arteries. O. D. suggestion of arteriosclerosis only.

Visual Fields:

Peripheral Fields show normal extent and form.

Central Fields show enlarged blind spot, a relative central scotoma and an absolute scotoma nasally about the size and position of a normal blind spot.

O. D. V. 5/4. O. S. V. 5/15.

Sent for examination of:

1. Nose and Throat.
2. General Physical.
3. Urinalysis.
4. Blood Wasserman.

January 17, 1923.

(After last examination had severe acute "cold in his head," laid up in bed.) At that time a general physical examination showed an acute catarrhal rhino-pharyngitis—temperature 100.4, pulse 110, a few rales at base of right lung; blood pressure 115/80

Urinalysis—negative.

Blood Wasserman—negative.

Nose and Throat examination showed an acute purulent ethmoiditis for which he received suction and local treatment.

Vision—O. D. V. 5/4. O. S. V. 5/9.

Fundus—presented a decidedly less violent picture. Less oedema, smaller hemorrhages, no evidence of exudate.

Veins less engorged.

Arteries less constricted.

O. D. shows no changes; O. S. shows decrease in size of blind spot.

Decided contraction of relative central scotoma and nasal scotoma is now missing.

No defects in peripheral fields.

The blind spot of O. D. is normal in size.

January 31, 1923.

Treatment has been discontinued. Patient feels practically well and still thinks that there is a slight shadow at the center of an object when first looked at directly.

O. D. V. 5/5—1. O. S. V. 5/5—1.

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Principles of the Treatment of Gonorrhea in the Male

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Despite the researches of Neisser, Finger, Oberlander, Wasserman and Lohenstein in the pathology of the urethra, and in view of the many new antigonococcal remedies flooding the market from day to day, thus indicating that the treatment of gonorrhea has not yet reached the goal of our desideratum, and in view of the fact, that many textbooks though of recent publication, still adhere to old traditions, I offer an apology for rehashing a seemingly trite subject.

In discussing the subject I shall merely outline the principles of treatment, thus leaving the mind of the reader unbiased in the selection of drugs, and treating the subject in the light of recent development of the unrethroscope by means of which living pathology can be studied most minutely from a clinical standpoint. However, the urethra alone is not the only seat of infection in gonorrhea, as has been demonstrated conclusively by Fuller and Belfield that, in many intractable forms of gonorrhea our attention must be directed to the treatment of the seminal vesicles.

Gonorrhea must be looked upon as a surgical disease, depending for its cure on perfect antisepsis and proper drainage. It is caused by Neissers diplococcus of which there are ten different strains. From a clinical standpoint we must admit the variation of the disease to be dependent on the strain of organisms infesting the genitals. Culturally this may be impossible, serologically, however, it is. That the course of the disease depends less on body resistance of the host than on the strain of gonococci, can be attested clinically, when often two individuals with different resisting power, one being in a perfect state of health, while the other less so, are infected by the same source. The incubation period in both may be unduly prolonged, giving the organisms a firm foothold in the deeper tissues before any manifestations of symptoms, and when the disease is fully established, it may be subacute from beginning to end.

Then again the manner of extension of the disease must be taken into consideration. It is assumed that, in the course of three weeks, as the gonococci multiply in the tissues, they invade the posterior urethra and its adnexa by contiguity. While this may be true in many cases, and one does not usually look for a posterior extension until the third week, it is not an invariable rule. A considerable number of posterior infections are seen in the first week of the disease, which must be explained by another channel of extension, namely, that of the lymphatics. That there is a selective action of the organisms one may be forced to admit when considering the various complications. Thus a patient with apparently a mild subacute urethritis develops either simple or suppurative inguinal adenitis. To refute this argument one may say that organisms other than gonococci associated with them are responsible for such complications. Perhaps it is so. But why do they not proportionately increase the local symptoms?

A stronger argument in favor of the selective action of the various strains may be looked for in gonorrheal arthritis. Instead of waiting three weeks for its development one often sees this complication arise at the very beginning of the disease. Furthermore, I have, in not a few cases, seen multiple joint involvement in both the donor and the recipient, thus proving to my mind conclusively the selective action of the gonococci.

Dr. Lisa, pathologist to the Metropolitan Hospital, is at present engaged in their isolation and grouping, and in due course of time, hopes to report his findings.

Assuming that several strains of gonococci are encountered in the disease, then one can easily explain the variation of the course of gonorrhea. Thus some strains penetrate deeply in the tissues of the anterior urethra, entrench themselves there indefinitely, and forming a condition known as a deep anterior urethritis, but sparing the posterior urethra and its adnexa. They usually cause a deposition of different degrees of soft and hard infiltrations. Then, again, there are organisms which infest only the superficial structures, thus falling an easy prey to the various anti-gonococcides used in the treatment of disease.

The next topic to be discussed is that of inflammation. Every type of acute inflammation consists of three stages; (1) engorgement, (2) exudation, and (3) resolution. Acute gonorrheal urethritis must necessarily be governed by the same laws of nature. The first stage is the shortest, lasting from 12 to 24 hours. This is followed by the second stage which lasting anywhere from two to six weeks in favorable cases, may end abruptly in resolution. The majority of cases, however, do not terminate so favorably; on the contrary, the second stage may blend indefinitely with the third or stage of repair, and exhibit signs of chronicity. The terms exudation does not only represent the visible discharge which appears at the meatus and in the urine, but also that which remains in the tissues, and is later utilized by them for their repair.

When the gonococci enter the urethra, they penetrate the muccous lining and arrange themselves in and around the glands of Littre and the lacnae of Morgagni. Under favorable conditions when drainage is good, they are carried out by the tissue discharges, and with their elimination from the tissues, reparative changes take place with almost complete restitution to normal. On the other hand, in chronic cases, the organisms, in the course of excessive cellular activity in the tissues, incite the fibroblasts to a greater state of activity resulting in a deposit of more or less dense scar tissue. Some of the organisms may cause greater destruction of tissue, with the formation of new blood vessels or granulations. Some or all of it changes into scar tissue. Many strictures are rich in bloodvessels and bleed easily, and urethoscopically we often find vessels in the midst of the densest strictures.

It is noteworthy that many chemicals used in the treatment of gonorrhea emulate the action of bacteria, and result in similar tissue changes. The intensity of their action depends on the relative strength of the solution used. The greater the concentration, the greater is the reaction in the tissues. Thus, the remedy, may, at times, be worse than the disease. On the other hand, in some chronic cases, we must resort to such drastic measures as to precipitate an acute inflammation, provided, they have not already been used over an extended period of time.

Besides chemicals there are other agents, such as, heat, cold and mechanical pressure which cause inflammatory changes in the tissues; and one or all may at times be invoked to bring a chronic case to a successful issue.

Of the various local remedies used by the old school are the mineral and vegetable astringents. They cannot be too emphatically condemned, for they not only destroy the bacteria but the living cells as well, resulting in the most disastrous and gravest tissue changes. Some insoluble salts of bismuth either in combination with astringents or alone have also been recommended by the same school, and the only hope to hold out for their action, is the effectual plugging of the mouths of the glands with undisputed mastery of the organisms over the tissues. The modern school, on the other hand, advocates, and logically so, the use of drugs which destroy the organisms with the least amount of damage to the tissues. This class is represented by silver and its salts on one hand, and various dyes on the other. While the dye stuffs may be used with advantage in conjunction with silver, when used alone, they are often useless. Silver and its salts, particularly, its colloids have a specific action on the gonococci.

This leads me to the principles of treatment. To begin with the acute stage, in which there are marked inflammatory changes in the tissues, with a discharge of pus, the drainage of that pus must be promoted; and just like an abscess, it must be drained from the most dependent part which is the meatus. This must hang low, and not be encumbered with unnecessary dressings especially absorbent cotton. Locally a solution which will destroy the organisms without exciting excessive inflammatory changes in the tissues be used; and that solution must remain in contact with the tissues for a sufficient length of time to exert its bactericidal effects on the organisms, without unduly irritating the tissues. If the silver solution used be too irritating to the mucosa, then, in the first place it is necessary to determine whether or not the solution is fresh; and, if so, then cut down the strength of it. At times it may be advisable to shift from (one) preparation to another. One cannot limit himself exclusively to any particular silver preparation or dye in the treatment of gonorrhea for the foregoing reasons. Ordinarily, when drainage is good, the disease terminates favorably regardless of the strains of organisms causing the infection.

If, on the other hand, the symptoms persist after a reasonable length of time, then, the cause must be looked for and removed. The anterior urethra is the first one to engage our attention. It should be searched carefully for infiltrations which interfere with drainage from the glands and which give rise to cystic distensions of them. Vegetations in the vicinity of glands often interfere with their emptying themselves. Such vegetations are more common in the posterior urethra. Paraurethral follicles which may harbor infection indefinitely, must also be looked for. The Cowpers glands must never be lost sight of, though it is a noteworthy fact that they are rarely affected. This may be explained by their position between the two layers of the triangular ligament, underneath the deep transverse perineal and the compressor muscles and surrounded by the superficial perineal muscles, by whose contractions they are constantly emptied. If there is a dense deposit of scar tissue in the bulbous urethra in the neighborhood of their ducts, or if the inflammation in the urethra around their ducts is so severe as to occlude the urethral end of their lumen, then they usually break down into an abscess cavity.

One must never be content with the examination of the urethra in front of the triangular ligament alone whether or not the search has been successful, but must proceed with the investigation of the posterior urethra and its adnexa.

The prostrate may feel normal, and yet cystourethroscopically their suburethral ducts may be seen discharging infectious pus. The colliculus seminalis, being a mirror of the prostate and the seminal vesicles, should very carefully be examined. The prostatic sinuses, the utricle as well as the follicles situated above the veru between the longitudinal folds coming down from the internal sphincter must be the object of our painstaking investigation. The lateral walls and the roof of the prostatic urethra including the internal sphincter are often the seat of cysts, which in some cases continues part of the way down on the vesical surface of the sphincter to the trigone. When the seminal vesicles are inflamed and distended, and, particularly, when their surrounding tissues are infiltrated, they cause the ureteral ridges to stand out more prominently; and, often, the trigone is in a cystic condition as a result of it. Hence, it is important to examine the trigone and the ureters for such additional information. When using the cystourethroscope of the writer, it is possible to view clearly the spurts of urine from each kidney without the additional risk of carrying infection by ureteral catheters into the kidneys.

The prostate and the seminal vesicles often come in for their share of abuse in gonorrheal infections.

The seminal vesicles, being situated high up at the base of the bladder above the prostate, are influenced considerably by the contractions of the bladder. They are placed at an angle of about 75 degrees from the horizontal plane of the body, which is very favorable for their drainage. This is further enhanced by muscular contractions of the bladder and the rectum. For this reason they are less apt to be infected than the prostate. On the other hand, if the prostate is badly inflamed, then, they are more likely to take share in it, due to the encroachment of the inflammatory process of the prostate on the ejaculatory ducts, thus interfering with their drainage. The spermatic cord should not be lost sight of, as this may at times, share in the process without involvement of the epididymis. When a funiculitis does occur, it is usually subacute, caused, probably, by less virulent organisms, the ciliated epithelium of the vas apparently holding them at bay. When it does occur in a subacute form, it may be successfully combated surgically, before reaching the epididymis.

Having ascertained the cause of the chronicity of the infection, one must still bear in mind the importance of drainage. If the meatus is tight it must be cut. The urethral glands must be emptied by dilatations, preferably with Kollman dilators, for the gonococci must be dug out of their strongholds. There are two places in the anterior urethra where dilation as a rule is imperfect; one is the bulb being the most dilatable and widest part of the urethra, the other that part immediately behind the navicular fossa and a short distance behind it. Therefore, for the former it is best to use a straight Kollman dilator, while for the latter, either the Kollman, the Weir or the Otis urethrometer may be used to the best advantage. In fact when only localized patches are present, it is best to use a dilator which affects only such patches, otherwise our whole plan of treatment is defeated. An acute reaction usually follows such treatments, and one must wait for the subsidence of such reactions before deciding on the next dilation. When the posterior urethra is involved, the dilations must be carried in there, being guided by the same principles. From time to time, the treatment must be controlled by the urethroscope, noting the difference in the appearance of the lesions. A considerable number of cases will be favorably influenced by dilations; on the other hand, there are some which will still continue to have symptoms. In this class of cases special measures must be adopted. Usually a number of folli-

(Concluded on page 179)

The Human Power Plant

CASPER L. REDFIELD.

Chicago, Ill.

It is said that "man is an animal," and we have abundant evidence that the statement is true. With that as a foundation we have made many experiments on other animals for the purpose of getting scientific information in regard to things which are characteristic of animals. The things learned by that process have been of much value to man, particularly in combating disease.

We may also say that man is a power plant from which we get an output of power. That output of power appears in the form of mental and physical work performed. When a man reaches that point at which he can furnish no further output of power, he ceases to be of further use in this world, and we put him under ground. If a man is of no use except as a power plant, then looking at him from that angle is the most important view we can take of him. However that may be, it is the intention here to consider him from that viewpoint, and to compare him with other power plants as we have compared him with other animals.

In a general way we are all familiar with the ordinary commercial power plant, but that familiarity is an easy one which has in it much misconception. To bring the human organism and the commercial power plant on a plane where they can be compared with each other requires just enough technicality to clear away misapprehensions without making the discourse tedious. In the first place it may be said that the present comparison relates to the power side of the problem and not to the anatomy of the two organization.

When we wind up a spring we do work, and that work is stored in the spring, as is evident from the fact that we can get it out again to drive a clock, pump water, or do some other thing requiring work. Work in the stored condition is called *energy*. In a spring which has been wound up, the energy is in the form of a strain in the molecules which form the spring. When we lift a weight we do work which is stored in the weight, and we can get that work out again by letting the weight fall. The energy here is energy of position. To give rotary speed to a wheel requires work, and the energy in the wheel is the energy of velocity. Other forms of energy are heat, light, electricity, magnetism and chemical affinity.

We have units for measuring energy. Ordinary work we measure in foot pounds. Heat is measured in heat units, light is measured in candle power, electricity is measured in volts and amperes, and so on. All forms of energy are transformable into each other, and given any one of them, we can get any one of the others, either directly, or indirectly through some intermediate form. This means that heat, light, electricity, etc., are different forms of one and the same thing, and are not different things.

In a commercial power plant we feed in coal which is said to contain heat units because we get heat units from it by a chemical operation. This operation (combustion) is carried on under a boiler containing water, and the heat units are transformed into pressure in steam. The steam goes to an engine where the contained energy is transformed into reciprocating motion of a piston, and then going through other parts is tranformed into rotary motion of a shaft. The energy in the shaft then goes through a mechanism called a dynamo and becomes transformed into electricity. Part of this electricity goes through a filament and is transformed into light, another part goes through a magnet and becomes transformed into magnetism, and a third part goes through a motor and is transformed into foot pounds. Condensed, we may say that coal containing heat units is fed to a furnace under a boiler, and we get foot pounds of work from an electric motor.

Heat units in the form of food are fed to the human being and we get foot pounds of work from his muscles. That is the condensed form of the statement which shows an actual transformation has occurred in the organism, but omits all reference to how or where that transformation occurred. As there is a long chain of events between the intake of food and the output of foot pounds, it is certain that the transformation from heat units to foot pounds is not direct but is through other intermediate forms of energy.

What are those other forms of energy?

In the mechanical power plant we followed the transformations of energy step by step from the furnace to the dynamo, and each device through which it went was a transformer. As a man can expend from 5,000 to 10,000 foot pounds per minute for an hour or more, and can swing a sledge hammer with ease, it is evident that the quantity of energy in a man is not so small that we need delicate instruments to detect it. As a man may begin instantly a heavy expenditure of energy through any one of several sets of muscles, and may continue such expenditure for a considerable length of time, it is evident that there must be a considerable store of energy on hand. In what form is that energy stored?

We say that a muscle contracts, but the statement is inaccurate. A muscle is a physical body, and a physical body does nothing of itself. All motions come from operations of energy, and consequently a muscle is contracted by some form of energy which acts upon and through it. And for energy to act it must exist at high potential and must run down to a lower one. In the transformer known as a boiler, the temperature of combustion must be greater than that of the water in the boiler, otherwise there will be no transformation. In passing from the boiler to the engine, the pressure on the steam side of the piston must be greater than on the other side, otherwise there will be no transformation from pressure to rectilinear motion, and so on.

What form of energy contracts a muscle, and is on hand in considerable supply for instant use for that purpose? It cannot be the heat form of energy because the muscle is contracted with equal facility whether the surrounding temperature is above or below that of the muscle. It cannot be light because muscular contraction occurs in the dark. It cannot be electricity because there is no high potential of electricity in the body. If it is chemical energy then it must be some chemical form with which we are unfamiliar. We do not know of any chemical operation which will cause a physical body to contract longitudinally and expand transversely, and then reverse that operation. We know of nothing in the chemical line which can be controlled as the fingers are controlled in piano playing, or as the vocal organs are controlled in speech.

If a scientific Hottentot should make an anatomical investigation of a mechanical power plant he could describe the structure of the furnace; the size and arrangement of the boiler and its tubes; the details of the dynamo; and so on. If he wished to study the physiology of the power plant he could point to the intake of

coal as food and the discharge of waste products as ashes; he might extend this to the urinary system by studying the intake of water through the feed water heater and the discharge of waste water through the condenser; he could describe the respiratory system by the intake of air and the discharge of carbon dioxid through the smoke stack; he could trace out the movements of piston, valve, eccentrics, etc., of the engine; and so on.

But if our scientific Hottentot got no further than such anatomical and physiological investigations he would have no real scientific knowledge about the characteristics of our mechanical power plant. To get real information he must tackle the power side of the problem. He must identify and measure the energy which enters the system as food (fuel) and must follow the transformations of energy step by step. He must identify each form of energy as it is produced, and must take cognizance of the essential characteristics of each transformer by which one form of energy is changed into another. In mechanics, two transformers which are exactly alike as transformers may be wholly unlike anatomically. This means that he must distinguish between essentials and non-essentials.

The same is true of man. We have our anatomy and physiology, but no real scientific information about the human power plant. To get that information we must attack the power problem in the living organism, and we must give it a consideration far beyond anything it has so far received. We must study vital energetics as distinguished from anatomy.

A muscle is a device for transforming some unknown form of energy into foot pounds, and it seems to have no function other than to act as such transformer. There is no escape from that fact, first because foot pounds of work do not come from nothing but must come from some energy source, and second because a muscle does not make the transformation directly from the heat units in food but from something derived through one or more stages from those heat units. An energy supply of some kind is known to be available for prompt transformation by a muscle into foot pounds of work, but we do not know the character of energy in that supply, or the manner in which it is stored. The first step would seem to be to identify that unknown form of energy and get some knowledge of its general characteristics which will be comparable to the knowledge we have of the forms of energy in our mechanical power plant. The next step would seem to be the identification of the organ which acts as a transformer to produce that form from some previous form.

Through his arm muscles or through his leg muscles, or through both, a man may expand some thousands of foot pounds per minute for hours together, but if he continues such expenditure indefinitely he will bring about his own death from no other cause than the withdrawal of foot pounds of energy. A man may withstand the effects of low temperature for quite a while without injury, but if the temperature is low enough and is continued long enough he will die because of being chilled. Becoming chilled is removing heat units, and hence a man's death may be caused by the removal of heat units and nothing else. Foot pounds and heat units are forms of energy, and hence life itself is a form of energy, but it is a form of energy which we do not know in the inorganic world.

If a man exercises the muscles of his arms by rapidly swinging heavy dumbbells or Indian clubs he soon becomes tired and has to stop for a rest. It is said that this fatigue is due to toxins formed in the blood by muscular exertions, but I don't believe it. The simple fact is that muscular actions exhaust the available supply of energy which is drawn upon to make the transformation into foot pounds, and when the supply is exhausted the transformation stops.

After a short rest the man may renew his exercise of swinging dumbbells, but soon he must rest again. After a short second rest he may begin the exercise a third time, and so on by alternate periods of exercise and rest he may continue for some time, but finally he has to rest for a longer period. In such a process not only is there fatigue of the muscles exercised, but fatigue of other muscles and organs. In fact a man may become generally exhausted by the actual exercise of only one set of muscles. A man who has thus become exhausted by the exercise of his arm muscles is in no condition to run a foot race or enter a debating contest.

From these facts there are several things to be learned about this form of energy. One is that the energy which contracts a muscle is stored within the muscle itself in a condition ready for instant use, very much as the energy stored in a spring is capable of instant use by the operation of an escapement. It is not produced as used, but is on hand in stored form for use upon release. Another thing about this form of energy is that it can move or can be transported from one storage place to another, and that a muscle which has its individual store depleted can have that store partially replenished by drawing upon the stores in other muscles. The flow of energy from one organ to another is not instantaneous like electricity, but is gradual and corresponds to the flow of a compressed gas as in pneumatics or steam engineering. It also corresponds to the radiation of heat from one body to another. It is more rapid than the flow of the blood stream so that if the blood is a carrier for this form of energy then it must contain a store of its own which it can give up promptly and later replenish its supply by drawing on other organs.

The brain is a device for transforming some unknown form of energy into that form which we recognize as thought. It seems probable that the form of energy which contracts a muscle is not identical with that form which operates the brain. If that is true, then the two forms must be readily transformable into each other and there must be some transformer for that purpose. The store of mental energy may be expended as foot pounds through the muscles.

If a person swallows an acid the system produces an alkali to counteract it, and if he swallows an alkali the system manufactures an acid. If a poison is injected into him by sting of insect or bite of serpent, the system neutralizes the poison in some way or other. If pathological germs gain entrance, the system fights those germs. It does not seem probable that every one of these diverse things are performed by one and the same form of energy, but that different forms of energy are employed in performing different kinds of work in an organism the same as in the inorganic world. However that may be, each and every one of these things call upon and use energy stored in muscles for the operation of those muscles. The evidence for this is found in the fact that if the poisonous attack is heavy or long continued, the muscles become weak,—that is, lose part of the energy stored within them.

We have some empirical information about anatomy and physiology as far as structure and movements are concerned, but very little knowledge of a scientific character about human beings as living things. We can get that scientific information only by a study of the ener-

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Disuse of Motor Mechanisms as a Cause for Constitutional Deterioration

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Degradation in muscles and associated structures accounts for many forms and degrees of functional deterioration in ways well known but too often unappreciated and untreated. While the causes of degradation are many, some part—and the larger part—is always, first and last, impairment in the motor centers capable of relief through right use. This use needs to be adjudicated in the instance with as much—indeed with more—care bestowed through its application than of any other item of restoration. Especially is this fact demonstrated in those of passed middle age and in disorders of disuse, nearly ubiquitous and wholly indefensible. Indeed the potency of disuse as a lowerer of the vital index is measurable in terms of central deterioration. So also is the index of reparability to be similarly measured. While the removal of sources of irritation is demanded, mere removal is by no means enough in any situation. Then the after effects which persist demand removal. The process is one of removing residua of disuse by judicious use.

Disuse cripplings constitute a major part of normal old age changes, but are paralleled in young adults in whom similar ones occur due to disuse, misuse and abuse. These are restorable by adequate and systematized use—and by no other known means.

A tangled skein will not disentangle itself; no more will a tangled human personality except by full realization and well directed effort.

The phenomena of degradation in muscle are such as stiffness, rigidity, infiltration, adhesion in parts designed to move, or be moved, freely including tendons, joints, periarthritic structures, especially arthroses and amphiarthroses. There is usually present some form or degree of tonic protective spasm, an index of irritation, whether focal sepsis or metabolic; also some tenderness, all combining to discourage movements. For example: such grouped structures as the muscles of the scalp, the neck, the shoulder girdle, the thoracic group, the trunkal, and the pelvic girdle. Impaired tonus and pliancy in these obviously exert compression or other inhibitions, or deteriorative effects, on the organs occupying the interiors. So also of the limbs.

Upon removing the effects of disuse or misuse by suitable voluntary use, the coefficient of efficiency is raised throughout the organism. It is a common observation that those muscles forced into use after disability—as in pareses, post-traumatic and post-infective or arthritic states—most promptly return to normal, notably the legs, because almost anyone is urgently impelled to get about. The arms suffer most because they are not so imperatively called upon to work. You will note that the last muscles to yield, in arthritis deformans, are those of phonation and articulation.

Consciousness resides in muscles, as also does subconscious memory. Valuable and necessary motor impulsions tend for many reasons to become repressed, confused, or to fade away. Neglect of muscle consciousness brings about a familiar group of disabilities. Among these are lapses of motor memory, lack of promptitude in reaction times, impaired accuracies in motor automatisms. Then follows an inability to perform normally in accord with structure and design, hence ensues a lowering of the coefficient of motivation, also of oxidation, of metabolism or nutritive elaboration.

Associated with these deteriorative phenomena comes a train of disabilities in structures functioning on the sensorimotor plane, such as relative lethargy, inertness, discomfort on movement, varying in degree as the sensitiveness be great or small, and as local tenderness on pressure, on impact, on movement, or on traction compression is exerted. Weight bearing of the body becomes irksome, painful, discouraged, then follows stiffnesses, rigidities, later deformations, loss of free and full performance, limited excursus, range or ambit, with restriction in arcs and planes of movement, also in joint motor adaptation.

Adhesions take place between structures designed to slide the one over the other. Contractures also occur whereby the length of muscles is limited by shortening of their fibrous attachments, of tendons and of correlated ligaments.

Changes such as these—and there are many others—make it desirable, often necessary, to forcefully restore structures to their original state. The reasons why complete re-establishment is necessary are many and seldom realized, at least in their full significance.

For one thing muscles thus deteriorated tend to discourage necessary self-protective movements and especially those which need to be performed in order to maintain the coefficient of oxygenation. Hence the lethargy which follows affects not only the body but also the mind. Decisions, enterprises are delayed or postponed. Disuse induces deplorable inhibiting effects on vital functions. So gradual, however, do subsidences occur, they usually escape attention.

In many instances I have profoundly impressed a professional colleague of even early maturity, by demonstrating upon himself how like a pretzel or rusted machine his structures had become. This demonstration was usually incidental to relieving him of some quite different disorder. His disuse cripplings were first manifested upon the structures associated with the organ exhibiting the disorder, but often not noted in the other areas or particulars.

Certain local structures will, after maturity, almost always show some forms and degrees of disuse cripplings or disabilities. The posterior occipital ridge attachments of scalp above and neck below, is a common site, often causing head distresses confusion states and sleep impairments. Here painfulness on pressure is often felt, with fixation of the scalp. The nuchal muscles, especially the lateral ones, and to less degrees the anterior and posterior, are commonly affected. So all along the back to the hips, pelvic structures, etc.

A common site for back pains, inability to stand long, is the attachments of the glutei along the posterior ridge of the ilium, also those attached to the external trochanter (gemelli, etc.), and the lumbosacral groups. Here is a fertile source of so-called "sciaticas." Now a sciatic neuritis is a rarity, whereas fibromyositic (rheumatic) disorders about the hips are common, often distressing or crippling; one of the most frequent is painful spasm in the penniform muscles attached to the posterior crest of the ilium and to the spinal column. After release these spasms, or rigidities, the pain and disability will disappear. Many times I have cured these so-called "sciaticas" by one or two treatments of combined heat and induced movements, followed by graded voluntary movements.

Disuse cripplings occur least in youth, more or less in early prime, but become more severe as old age approaches. Too much use is often more harmful than too little at any time of life or state of fitness. Each citizen should become familiar with the seriousness of disuse or overuse and how abuse effects arise and vary at different ages and conditions. The confusion which exists on the subject deserves clarification. The category of disuse phenomena and correlationships may be sketched as follows in their associations with fundamental body actions:

Integrity of structure depends so fundamentally on right use or function that disuse, inadequate or improper use, induces deteriorative effects on correlated organs.

Similarly any organism suffers in such varied directions and particulars, from impairments of correlated motor structures through disuse, that the only means of completely restoring organic competence is by re-establishing competence in use of movements. Thus, in the enterprise of organic restoration, the element of disability in the motor background must be reckoned with, otherwise the full clinical obligations remain undischarged.

These disabling effects are most graphically displayed in the muscles, the prime mechanism of movement, and also in the white fibrous structures, about the joints, peri-arthritic and mobile mechanisms. It is a common experience to meet a patient who has consulted several excellent physicians without relief, but who becomes greatly benefitted by certain radical changes in conduct, such as by alternations of activities and rest, or other demands upon the movements and functions. Some of these exertions may and do involve fatigues, anxieties, excessive demands on energy, in short, a marked shaking up, seemingly enough to do harm and yet by right use the discomforts are made to disappear.

Why? Well, for one thing disused structures are thus called upon to do so much, to perform, and in such different particulars and directions that the organism as a whole becomes perforce readjusted.

The principle we are dealing with here is closely analogous to that which underlies a common experience of every day life. When upon occasion, while we are vaguely indisposed, distressed, even seemingly fatigued, some sudden, unescapable demands being made on our exertions, we are promptly restored to balance; or we "make up our minds to work it off" and this, curiously enough, rewards us with far more success than might seem safe or even judicious to the timid ones.

Now the medical adviser is here presented with an excellent hint. Is there involved a sound principle of remediation, of re-establishment? I believe there is, and hence would direct attention to:

The significance of disuse cripplings in diagnosis, prognosis and repair. Another common experience—somewhat analogous—is to find your "motor" mechanisms rebellious, cranky, recalcitrant, after the most careful readjustment. Then when it is possible to get a downhill grade, and compel the mechanism to go for a while, the result is harmonious progress.

In the human machine many elements of suffering or disability are directly traceable to inadequate use, disuse, misuse, abuse of those movements demanded by our design in function and structure, to maintain functional poise.

Among the disorders which may be mentioned, are: (a) structural: anomalies of tone, over-tension or relaxation, in static or kinetic poise, a motor disequilibrium, in push, pull, pronation, supination or torsion; in pressure and counter-pressure, in defective organic support, in tense local fixation, by uneconomic compensation, by tonic protective spasm, intra-articular over-pressure, imbalanced intra-abdominal over pressure, also adhesions formed between these and other muscles, also about tendons and periarticular structures.

(b) Chemical or enzymatic anomalies due to inadequacies of those counter-forces, pressures and relaxations essential in fluid and gaseous interchanges, in distribution of blood and lymph propulsion, in oxidation, oxygenation, in tissue respiration, dependent as these are upon full functionation of not only the big muscle masses but the adequacy of rhythmical movement of bones, etc.

(c) Anomalies in the reflex domain, the moto-sensory equilibration from remote periphery to complex centers and sub-centers and back again in due form and degree, etc. All functions are carried on through reflex actions, i.e., motor acts performed automatically in response to sensory impressions, hence impulsions to do. Also reflex circuits not only vary in their completeness and promptitude, they readily become depleted of energy, need rest to recuperate and renew their responsiveness.

(d) Anomalies in the emotional and volitional realm, impulse or motive, not only to move but to maintain equipoise, equanimitas.

These psychogenic anomalies are deeply significant factors in the disturbances of vegetative, reproductive, and other factors in the life of productivity, many of which escape adequate appreciation or explanation. Among the explanatory points are those involving strained, fixed attention, hence suspended respiration, retardation of circulation, of blood and lymph propulsion, in self-suppression of the emunctories, renal, colonic, fecal, and various vitally important motor discharges, involving destabilization in the organic rhythms, the cycles of energizing, anomalies of energy storage, discharge and renewal.

(1) *Respiration.* Competence in breathing depends chiefly on the mobility of the thoracic structures. Powers for full breathing are notoriously impaired as middle age proceeds and old age approaches, and even while living under favorable circumstances. The whole chest (thorax) usually suffers more or less from a gradual rigidity of its moveable structures, especially of the tendons, joints (amphiarthroses, synarthroses, diarthroses), of the bodies of the vertebrae, the pubic and sacroiliac, of ribs and muscles which move them, both the direct and collateral. They lose tone and adjustibility; the fullness of combined action (sweep, range, excursus) becomes limited and impaired. The action of the diaphragm, which supplements not only the acts of breathing but also many of those of circulation and digestion, likewise becomes restricted from insufficient mobility, pliancy, elasticity. So also does the musculo-tendinous wall of the abdomen deteriorate, likewise the associated posterior muscles, the psoas, the iliaci and quadratus lumborum, etc., which lie along the front of the backbone and are intimately concerned in holding the body in normal postures, also the important function of exerting counter pressure on the thoracic and abdominal contents.

(2) *Digestion.* The processes of digestion depend in great measure on normal motivation, hence on the tone, power, support, counter pressure and adjustability of the walls of the abdomen, the diaphragm and partly (or secondarily) on the psoas, iliaci, quadratus lumborum, the gluteal muscles, and those of the upper thighs. While they are primarily designed to afford support, keeping the hollow abdominal organs in their proper places and relationships, they also aid in producing the desired kinds and degrees of hydraulic pressure and counter pressure

whereby tubular action is sustained and regulated, also propulsion of their contents. Relief from stagnation is thus afforded. Motor efficiency of the organs themselves is becoming recognized as of increasing significance in digestion, so also of the indirect effects due to alterations in the motor efficiency of the contributory structures which sustain and assist their action.

These effects described are especially important in, e.g., evacuation of the bowels in which voluntary acts of pushing and pulling (compressing) the abdomen are of direct aid. These are especially noticeable when the situation of the liver is considered; also of the colon. Bending, turning and thus compressing the liver and colon is well known to expedite bowel action, and to induce promptitude in defecation. Torsion or rotation is the most important as Henry Winsor and I have shown. (American Medicine, 1922.)

(3) *Circulation.* Circulatory competence depends in large measure on freedom in motor functioning of the heart and arterial trunks. The heart lies poised on top of the thoracic diaphragm and in the center of the lower plane of the thorax. This vital pump must have ample space and room in which to do its ceaseless work, unrestricted by bony, tendinous or muscular compression; this includes the aorta and larger arterial trunks. Disuse of the great muscle masses not only depresses blood and lymph propulsion in them, but also impairs tissue respiration, oxidation and elimination. Thoracic competence, distensibility, compressibility, adjustibility, hence mobility, is of equal import in circulation as in respiration.

(4) *The Genito-Urinary* group of organs depend for their integrity and normal functionation on adequate support, on muscular and fibrous reinforcements, on collateral actions, mobilities, and on freedom from protracted compressions. The pelvic diaphragm must be competent. In the female these favorable morphologic conditions exert a special bearing on ovulation, on pregnancy and the varied acts of the reproductive cycle and gestation.

In the male, as senescence approaches, the prostatic gateway to the bladder readily becomes obstructed by over-growth of tissue and this is aggravated by disuse of voluntary pelvic structures, attachments of the hip and thigh muscles and is relieved by systematic use. I showed some years ago (*Journal of Urology*, October, 1916, also *Therapeutic Gazette*, April 15, 1922) that certain primitive exercises, long stretching movements of the thighs, contribute efficiently to releasing stagnation of blood and lymph in the prostatic plexus.

(5) *The Acts of Walking Well as Factors in Conservation.* Thigh, leg and foot action generally demand for their satisfactory performance freedom from secondary or acquired restrictions. Limitations of movements are least evident in those structures which keep in more or less constant use and is most evident in those least used, e.g., those of the hips and pelvic attachments. Restriction must be released, function must be performed, or the great oxygenating laboratories fail to do their work and the creature suffers cellular and colloidal depreciation. Impaired leg action makes for diverse and serious perils from slips, falls, impacts with e.g. passing automobiles.

The effects of each and every disease which induces loss of power or impairment of normal movements in voluntary structures, tend to affect most those which are least used, which can most readily escape action (op. cit.) e.g., the arms suffer far more than the legs even where the central disorders are equivalent; likewise certain muscles in the arms or in the legs, which can be omitted from use and allow others to do all the work, degenerate most rapidly. Disuse cripplings form a fertile ground for decrepitudes of all kinds and of all causations.

(6) *Arm and Hand Facilities and Proficiencies* can only be maintained by conserving flexibility of all the structures concerned, both the direct and contributory. Pursuit of livelihood or occupation of any kind is liable to require use of the arms. Accuracy of motion is of vastly greater significance in the arts and industries (economically) than mere power. Precision also exerts a large influence on confidence, poise, hence on personality. Slip-shod doing is the product of inexact volition, of muddy thinking and determination.

It is this accuracy of motion and co-ordination which suffers most from loss of flexibility and mobility; hence free, full arm and also shoulder motions demand suitable conservative and reconstructive measures. The capacity may persist but is valueless unless functions are performed with regularity. The creature suffers inevitably in diverse collateral directions.

(7) *Special Sense Integrity* depends—in great part—upon a normal mobility, pliancy, and flexibility in the tissues of the neck. Unless these nuchal structures afford full mechanistic (bio-kinetic) opportunities for the ebb and flow of fluids from the trunk, the structures of the sense organs suffer from hydrostatic interferences, not only in passage of nutrient fluids but also of nerve impulses. Not only does the integrity of organs of special sense depend on the pliancy of the structures composing the neck, but the brain and origin of the cerebro spinal nerves and sympathetic subcenters are likewise hurtfully affected. Rigidities in the nuchal and throat structures exert compressions on the tubular highways and the organic integrity of subsidiary spinal centers also suffer, also scalp rigidities, headaches, etc., as explained elsewhere. The whole personality thereby suffers, mind, emotion, temperament and morals, are all jeopardized and depreciated.

(8) *Motor Education of the Spinal Column in Order to Conserve or Restore Efficiency of the Spinal Reflexes.*

The spinal column is subject to limitations of its normal mobility, pliancy, which result in a diversity of minor and many major impairments of function. These may be merely static, contributing to limitation of thoracic mobility, hence of disordered states in respiration and of circulation, by obstructing the action of the lungs and heart and great vessels at their origin, or by a limitation of function which occurs in the subsidiary spinal centers, in the cell bodies between the vertebral masses.

Experience has demonstrated to me the extreme value of mobilizing and of exercising the backbone. (See article by the author: "Spinal Significances," American Medicine, July, 1918, "Origin and Significance of Minor Vertebral Deformities, N. Y. Med. Record, July 30, 1921, also by Henry Winsor and myself, 1922, three articles). The method for regaining mobility of the backbone is briefly as follows:

It is well to begin by directing certain exercises to the waist muscles, graduated carefully and deliberately, in particular rotatory, torsion movements confining attention to these for some weeks. Then proceed to direct passive and passive-active backbone movements while seated or lying, hands clasped on top of head, and also at back of head, bending sidewise, forward, and backward; then turning. Later stand and perform them on similar lines and in wider excursus.

In particular I would recommend that the patient shall acquire voluntary command of the different areas of the spinal column. This control is possible to a remarkable, and for most persons to an unexpected degree. A single vertebra can be trained to be thrust out posteriorly—not that the bone is altered in its relation to the one above or below—and can be made to *seem to be*

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The Interrelation of the Legal and Medical Professions*

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My talk was planned to be more to the medical profession than to the lawyers because the latter know all that I could say, but the doctors do not always understand how dependent we are on the medical profession. There is no such thing as the administration of law independent of the medical profession. There is no separation in the administration of law and the administration of medicine; the medical man is not separate and distinct from the law. The law helps the doctor, maintains him, punishes him and also protects him. The medical and legal professions are so interwoven that there is no separation of them. To illustrate: Justice O'Malley may sit to-morrow trying a case. He represents the Supreme Court. Lawyers appear before him and plead their cause. They argue, he decides. But what are they to argue what is he to decide? The administration of the law is dependent on the facts and where do we get the facts? We get them from witnesses or from records and the facts are developed in the large majority of cases by the medical profession. So the law is simply the machine. The result is not produced by the machinery but what goes into the machinery. I have never seen the statistics, but there are millions of dollars transferred every year from one person to another, not by a judge of the Supreme Court but on the mere say so of a physician. In insurance cases, in accident cases, in will cases, in all sorts of cases the doctor's word is taken for the transfer of property from one man to another, or to or from corporations. Lawyers are a part of the machinery and the thing on which they act is a fact, the fact must be furnished by some document or by a person, many times by a doctor. So that physicians and surgeons have become an addition to the courts, and the law's power to-day to act without the doctor or surgeon is limited. So it is in regard to life itself. In a murder case we find the experts arguing one against the other. The law is simple enough but the administration is difficult because the facts shift to which the law is to be applied. Many a man has gone to the electric chair, not because the judge sentenced him or the district attorney prosecuted him but because some physician said he was sane, and the jury found the verdict simply upon the word of a doctor. Yet we say the court did it, the judge sentenced him, the district attorney prosecuted him, but as a matter of fact the doctor sent him to his death. In the Eno will case the jury founded its verdict on the word of a physician. We find this all through the administration of law; We are helpless to do justice without calling to our aid the medical profession. And the medical man does not seem to realize this; he comes to court so glibly, so indifferently, so carelessly without seeming to realize that the transfer of valuable property, the life of a fellow man, depends on the testimony he gives. The medical man in the last analysis is the Alpha and Omega of the entire proceeding.

There is nothing in the law to execute until there is a fact and the facts in many cases are obtained from the medical men. There was a case recently in which the town of Moravia, N. Y., at one end of Cayuga Lake was accused of maintaining a nuisance whereby typhoid fever broke out at the other end of the Lake. Judges, jurors and lawyers for the prosecution and for the defense depended on the testimony of the physicians and the contest waged betwen them. They even presented wax models of the bacteria, the colon and the typhoid bacilli to make the case clear. It was settled in that case that no disease of importance could be transmitted from the lower animals to man. The whole question of guilty or not guilty was dependent on what the medical profession knew. This illustrates that the administration of law is at times absolutely interdependent upon the medical expert.

There is no such thing as a court of justice without the medical man. There can be no court administering justice to-day without the aid of the medical profession. In this case the reason for the verdict was the opinion that no disease of any importance could be transmitted from animal to man, but the next week we had a case under the Workman's Compensation Law which the doctors decided the other way. A man was leading a horse which became frightened and breathed heavily in his face. The man died of glanders because the horse had glanders. In this case the physicians decided the man could contract a disease from an animal and the family was in consequence awarded a sum of money. Who did it? The Commissioner, the Court? No, the doctor who said it was possible for the man to contract glanders from the horse having the disease. So we have had cases of anthrax arising under the Workman's Compensation Law. No case under this law is ever disposed of unless there is a physician in it.

As I have said and illustrated, the legal profession is dependent on the medical profession, and the medical profession is dependent on the legal profession. The law regulates the practice of medicine, and through the various departments of health directs what shall be done in many cases. There are laws regarding what a doctor shall or shall not do in cases of abortion, in birth and the control of birth. In nearly every phase, the law steps in to control the medical profession. The law is a danger sign; before you get in trouble, STOP, LOOK and LISTEN!

All this leads to the third thing I want to direct your attention. While the two professions depend on each other there is a feeling in which we differ widely and it is because of this difference that the continual discussion goes on between physicians and lawyers, between medicine and law. There is a difference in our viewpoint as we look out on life. The criticism that you offer us and the criticism that we offer you is bound to exist unless the doctor understands the viewpoint of the lawyer and the lawyer

* An address delivered before the Society of Medical Jurisprudence at the New York Academy of Medicine, April 10, 1922.

understands the viewpoint of the doctor. The physician looks to the individual; the lawyer never does. The physician has his training in school and college hospital; he learns to diagnose and to heal. But it may be that all he has learned may give way in the presence of a crisis and he casts this all aside in trying to save a life or a limb. In other words, anything goes that is for the benefit of the individual patient. As he treats the patient he is not thinking of the paper he will write for a medical society, he is not thinking of the science of medicine, or the art of surgery; his whole mind and nervous force goes out to the individual, and he treats him according to his individual needs. There is nothing that comes before his sight or in his thoughts except the boy or girl, man or woman who is under his healing power. It is not so with the lawyer. We deliberately do injustice sometimes to individuals. The public cannot understand it, many physicians cannot understand it. But the law does not start out to do justice to individuals. Its rules were not made for individuals. The law looks to the community as a whole in everything it does. You cannot have any rule that applies to all alike without finding that it will occasionally work injustice in individual cases. These rules have to be applied for all; they look to the good of the community. For instance, according to The Civil Practice Act a physician is put in the privileged class. He cannot be allowed to testify to what a patient has told him in the course of consultation. A certain physician knew that a man had committed suicide, but he was not allowed to give this testimony when the case came to court. The beneficiary brought suit to recover on the insurance policy and the insurance company defended because there was no liability in case of suicide. Yet the company could not prove the fact, as the only man who knew about it was the doctor and he could not testify. This law is founded on experience; if men are free to confide in a doctor under the sanctity of secrecy, the doctor will be better able to administer help and assistance than otherwise could be given. So for the greater good of the community the patient has the right to confide in a doctor and the law says his mouth must remain closed. We have the rule also that a dead man cannot be testified against, that a confession must be corroborated, that no man in sexual cases can be sent to jail on the testimony alone of the woman. These are all wise laws and have been gathered out of experience. In many instances they work hardship and injustice, but the reason is that we choose the lesser of two evils.

This leads to another thing where the medical profession thinks we are very harsh. It also grows out of the different viewpoint. The physician thinks we have a harsh rule in that a man may be as crazy as a March hare and yet if he knows the difference between right and wrong he ought to go to prison or to the electric chair for his crime. I had a case of that kind where the second mate of an ocean liner killed his captain. He had not succeeded in collecting money due him through legal proceedings in this country. Believing the law was a sham, and that to get real justice he should take the law into his own hands, he killed his captain. According to the doctor's standpoint that man was insane, but the law declared that as he knew what he was doing and that it was wrong, and as he knew the nature and quality of his act, he therefore must suffer death. We were harshly criticized for this, but we would not change this ruling for all the world. Our rules are rough and ready, a club whereby we make the insane man sane within our rule and put him to death rather than have our streets infested by criminals. The doctor is more liberal, but his wide and broad rule of insanity would be very unsafe when applied to the criminal law—it would shield too many. Our rules are for the general welfare of the public, dealing with the general safety and protection of the community. You, the physicians, treat the individual and are dealing with him as such.

Sufficient to say that the two professions go hand in hand. At some points we radically differ, but as we differ so we come together. We are together in our practice, but we differ in our theories, we come together again in our aims and purposes.

I am always glad to be with physicians because we all depend on you to help us administer the law, and I want you to remember that you might not get very far if it were not for the lawyers and the courts.

Discussion

Dr. Edward E. Hicks: I will not attempt to dispute any of the remarks or suggestions of the speaker for he is a neighbor of mine and I desire to live in peace. But this has been a very interesting and enlightening address.

Judge Stephen Callahan: We do not know everything; we are dependent on the testimony of experts. Recently a most interesting case before me involved the question whether or not there is a nuisance in a certain section of Greene County from what is known as smelter's smoke from sulphur dioxide. It was claimed it had a bad effect on vegetation for three-quarters of a mile about the plant. I learned more about chemistry in that case from the experts we had than I ever expected to know. I had never heard of a plant pathologist, but we had one there and he told us about the effect on plant life of SO_2. We had some of the most noted bug experts in the world, and one of them told us that insects had destroyed the plant life in that section and it was not due to the smelter's smoke. That in a measure illustrates what Judge Crane said to you. We are helpless by ourselves. You are decisive in many cases. My experience has been that most doctors who come before us come well grounded in the subject matter on which they testify.

Judge Alfred E. Ommen: If I understood correctly, Judge Crane said that the courts did not amount to anything, the lawyers did not amount to anything, the prosecuting attorney did not amount to anything, that the result depended on the facts and that the facts were supplied by the doctors. Then he said that when the doctors said a man was insane the law did not pay any attention to that fact, for there the law stepped in and said so long as the man knew the nature and quality of his act and knew it was wrong, that no matter what the doctors said it did not make any difference in the condemnation of the man to the death penalty. I am afraid that in the general practice of the law the doctors often find that same situation; even though they present the facts the Judge and jury do not pay any attention to what the doctor says no matter what facts he presents. That leads me to think of another position and that is this: While that old rule of Lord Hale has come down since 1846 about knowing the nature and quality of the act that is wrong, I often think that a very harsh ruling. The one thing the law seems to forget is that a mental condition is a disease. There is not much desire to differentiate among laymen, courts, and lawyers between a man who has diabetes and one who has dementia precox. If a man is ill and the attending physician says he has pneumonia, the average layman says he must have pneumonia because the doctor says he has it. But if a doctor says a man has dementia precox, there are many who will say that it is possible the doctor has made a mistaken diagnosis and the man has not got dementia precox. It seems to me that matters should be carefully analyzed and carefully considered. If the law accepts the doctor's evidence as to whether a man has a Colles' fracture and gives a verdict for it, should not the law believe the doctor when he says a man has dementia precox? I think it is a serious thing that in law the doctor is not always given credit as a mental expert as to whether anybody is mentally sick. It seems to me, if the matter were given the study it should have, that

the law might some day give way and let the doctor supply the facts and let the facts carry conviction.

Dr. W. L. Zwisohn: If I understood correctly the purport of Judge Crane's address, he appealed to the physicians to recognize their responsibility in their relations with the legal profession. After a practice of over thirty-four years and associating with fellow members of the medical profession, I must say that as a rule the medical man undertakes his responsibilities as well as he can. But I would like to make an appeal on behalf of the medical men. Why not make an attempt to educate the public to realize that the medical man's services should be recognized and respected. We have so many quacks and charlatans who have and are undermining the standing of the regular practitioners that it is strange that they should be allowed to practice. Osteopaths were allowed to secure licenses to practice as physicians against the consent of the medical profession, and the Governor of this State is now hesitating to sign the bill to allow chiropractitioners to become licensed practitioners. If the public was educated to a discrimination between those who have and those who have not real ability to heal disease, the medical man would receive the general recognition and respect to which he is entitled.

Dr. William Steinach: In this matter of the legal aspect of insanity, this rule comes down from 1848 from the McNaughton case in England. At the present time, some of our states realize that insanity is not a question of knowledge of right and wrong alone, but a question of will power. A few years ago a case was decided: a colored convict suddenly said to a fellow prisoner, "The voice of God commands me to kill you; I know it is wrong, but I must kill you because the voice of God has commanded me to." The man was executed. What is the object of criminal law? Is it not to deter others from committing crime An insane man cannot be deterred from committing a crime by the execution of another insane man. It is a question for the jury to decide whether a prisoner was responsible or not, and I hope the time will come when the law will allow the question of insanity and responsibility, not to be governed by a hard and fixed rule, but to be judged by a jury according to the facts presented.

Mr. Frederick N. Van Zandt: I do not agree with the gentleman's suggestion that the law be changed. Let me emphasize Judge Crane's point of view. A man sits down and writes out his will. He is a very intelligent man, has resided in his community for thirty years and is well thought of and respected. He writes it in his own handwriting. I have been his neighbor for fifteen years and he calls me in to sign the will as a witness. He is my friend and my neighbor and I gladly do as he requests. I witness the will. He puts it in his safe. Later he dies. The will is produced and offered for probate. It is read and turns out to be a very suitable will. It is this man's own expression of his wishes in his own handwriting, and the product of his own mind. But the surrogate declines to probate the will because there were not two witnesses. This is a rank piece of individual injustice. But there was a time when a man could not dispose of his property by will; it reverted to the crown. Then came the Statute of Wills and it created a right given to people generally, and that Statute laid down certain rules and regulations which were required of anyone who sought to take opportunity of that right. One of these rules required that there must be two witnesses and that they must both sign the will, for the purpose of preventing fraud and injustice which might be done in certain cases. There we have another illustration that if we laid aside general rules laid down for the benefit of all to prevent injustice in particular, we are apt to do grave injustice to hundreds and thousands of others. The present rule regarding a man's knowing the nature and quality of his act is a rule of law and neither Judge Crane nor Judge Callahan have any more power to change that than I have. It was passed years and years ago and it provided that if any man was so deranged mentally as not to realize the nature of his act he was not a criminal but an insane man. I agree with the medical profession that a man who possesses a mentality which prompts acts which result in murder is not guilty of his crime but is guilty of an act which denotes a diseased mind, and I would relieve society of that man's presence as quickly as possible. But we cannot do that. Take the Thaw case. Here was a man who had in his hand a revolver that had the power of destruction. He put his finger on the trigger, aimed the weapon so accurately that the bullet hit the victim and killed him. To suggest that that man did not know the nature and quality of his act is ridiculous. The law when it was passed contemplated a raving maniac. When we introduce into our system of jurisprudence active analyses of the mind and excuses for relieving a man of his crime and let him go free on the ground that he is suffering from mental disorder which prevented him from resisting the impulse to the act of crime, then we are in danger. The remedy is to change the law entirely if you don't approve of it.

Judge O'Malley: When one speaks of changing the law with respect to the defense of the insane, one must stop and think of what it might lead to. There are so many varying opinions as to what constitutes insanity. There have been learned alienists who were of the opinion that Theodore Roosevelt was insane, have said he was a paranoiac, and mediocre men have expressed the same opinion of other prominent men. If you oppose a defense of insanity as an excuse for crime, you can see how easy it will be for many criminals who commit crimes to escape. I was a prosecuting officer of this County for seven years and in the course of my experience prosecuted many charged with murder, and I have never found any great injustice with respect to the administration of the law so far as insanity is concerned. Personally, I would hesitate before I would change the requirements of the law for the reasons I have indicated.

Dr. Haviland: There are many things one might say on the relation of mental disease to what the law terms insanity. I would like to protest against the term "insanity" for the term has no medical validity whatever. We deal with mental disease of varying types and degrees of severity. Another mental disease destroys what we denominate responsibiltiy. It is a very difficult thing to deal with a question of this kind by hard and fast standards, for we have no absolute standard of normality or of normal mental states. We have to use as a yardstick a general average and that it is impossible to reduce to terms of exact definition. Injustice is the exception rather than the rule under our present practice, yet there have been instances of great injustice from a strict interpretation of what consitutes insanity as a defense for crime. In my experience I have learned to believe that the majority of insane criminals suffer from that form of mental disease which does not in any way interfere with the intellectual comprehension of the nature and quality of the act. It is a failure of the inhibition, due to a diseased mentality, which should direct their acts in accordance with social custom and criminal law.

Dr. G. Alfred Lawrence: It seems to me that Judge Crane's remarks are based on the premise that the machinery of the law cannot be changed. Why cannot the legal profession change and progress in harmony with new discoveries made by the medical profession? A great injustice is done at times by applying this law of legal responsibility to persons who have mental disease. Why not arrange the legal machinery so that cases can be cared for and society protected? This has been done in Germany. If the law and medicine get together they can arrange that both society and the individual can be protected and justice will be done both from a medical and legal standpoint.

Judge Crane: The law can be changed; there is no question about that. But I think the trend of my remarks was misunderstood. I tried to make clear that the doctor looks at the individual, and the law should not be changed to deal with individuals. We are dealing with the community as a whole and we cannot make a rule that will apply to the individual without endangering the community. We must have rules broad enough to carry out the purpose of the law. The purpose of criminal law is to keep your homes, your women and children and your streets safe. I had a friend once who would not serve on a jury; he was opposed to the death penalty. The "Masonic Burglar" who was later tried before me and got forty years in Sing Sing, got into my friend's house one night, and robbed him at the point of a gun, even taking the rings off his wife's fingers. The next day my friend wanted the law to include the death penalty for burglary. It makes all the difference how you look at these things. My point of view is that in the dealings of your profession you must have a broad and humane way of dealing with people. We are dealing as a government, and our view is a general one and includes even the cases of compulsive insanity There is no question but that there is compulsive insanity, but when we come to the law we must not think of the man, but we must think of your homes, your women and children. Law is a matter of government, and where that one man has the real disease called compulsive insanity, any criminal in New York can declare he was compelled by the Lord God to do the same thing. You must think of this; we do not think of the individual; we are thinking of the best way to get rid of the criminals and rid the streets and homes of his invasion. Where in one case a man has compulsory insanity we cannot listen to such a flimsy excuse for murder; you cannot put anything like that over on us. No, I would not have the law changed for anything in the world because it protects us all.

Thoughts Concerning Gall-Stones; Cholecystostomy vs Cholecystectomy

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The past twenty years mark a memorable epoch in the field of abdominal surgery. Two decades have elapsed since a critical survey of gastric and hepatic affections have had applied to them the best surgical thought of both hemispheres; today we know well the surgical possibilities and the surgical limitations in both of these major divisions of abdominal surgery.

We have selected for consideration the gall-bladder, because of the great diversity of opinion among surgeons as to the treatment of gall-stones and allied affections and because the progress in this field has been constantly in the ascendant.

Twenty-five years ago the operations as done today would have been regarded as fanciful in theory and impossible in practice; today removal of the gall-bladder is a familiar operation and its removal without drainage is a most common occurrence.

The diagnosis of cholelithiasis is often beset with difficulties because of the analogous symptomatology with so many other abdominal affections. Indeed, it has been repeatedly shown that pain during the early hours of the morning awakening the sleeper may be the only signal announcing the existence of the malady.

Gall-stones in gall-bladders free from infection may give symptoms from obstruction, or from the movement from the passage of the stone, but in such instances there is lack of all gastric symptoms or, at least, such symptoms are not a major complaint. On the other hand, when gastric symptoms are evidenced, the presence of infection is assured. These gastric symptoms are present in infection of the gall-bladder, whether stones are present or not. Many of these patients who are free from infection may be cured by simple drainage.

Because of adhesion and fixation of the gall-bladder and consequent impairment of function due to the operation of drainage, a few of these patients may be liable later to cholecystitis. When infection is lacking, even if stones are present, the glands along the cystic, common and heptic ducts should be found but little enlarged on palpation. It is the consensus of very many of the best surgical minds that patients who suffer an infective condition of the gall-bladder should undergo the operation of cholecystectomy whether stones are present or not, since infection is the essential element.

Let it be said at the outset that colic may be present without the existence of stones and, *per contra*, the gall-bladder may contain calculi without the presence of gall-bladder colic. The reasons for this are easy of explanation.

The symptom which first suggests the presence of gall-stones is biliary colic which, however, is no absolute sign of an attempt at expulsion of a stone, since it may be the result of an inflamed gall-bladder or be recurrent and no gall-stone be present; and there may be no colic when gall-stones large enough to produce intestinal obstruction have escaped into the bowel.

The attack of colic is, in more than one-half the cases, followed in the course of a few hours by rigors and an elevation of temperature, frequently as high as 105° F., and the fever usually subsides with the cessation of the colic. It may be continuous, remittent or intermittent, and is an expression of the degree and the severity of the infection.

For many years surgeons overlooked cholecystitis without stones, these patients suffering from colic and mucous obstructive attacks with local tenderness. Often there was a better external appearance of the gall-bladder than in those bladders that were saved after removal of stones. Indeed, it was not uncommon (and not so many years ago), upon opening the abdomen and seeing that the gall-bladder looked "healthy" and upon palpation feeling no stones, not even to drain the gall-bladder. What was the result of this inaction? Almost invariably some subsequent operation was demanded, some of these patients at a later period developing gall-stones.

If cholecystitis is an infection of the gall-bladder from which bacteria can usually be cultured, then the lymphatic glands draining such an area should show evidence of such infection. The glands along the common, hepatic and cystic duct should be enlarged in such cases and if not affected, then some other etiological factors accounting for the condition should be searched for. These glands also drain the duodenum and the head of the pancreas, and the analogous symptomatology may find an expression in a pancreatitis, a pancreatic calculus, a duodenal ulcer, etc.

Another interesting point to be mentioned in connection with affections of the gall-bladder, is the association of papiliary growths springing from the mucous surface and later developing into carcinoma. The Mayos, in a series of different papers, lay great stress upon this fact and the statement is taken up by many able surgeons who are in perfect accord upon the likelihood of such a metamorphosis. Many surgeons assert that gall-stones predispose to cancer of the liver. It is asserted that 85 per cent. of the cases of cancer of the liver are metastatic and that fifteen per cent. or the remainder, which represent primary cancers, have their genesis in the gall-bladder or gall-ducts. Cancer of the liver, for instance, in impacted stone and possibly in papillary cholecystitis, is undoubtedly avoided by cholecystectomy.

A word as to x-ray diagnosis. At the present time the dependence placed upon the employment of the rays is not a popular measure among the vast majority of surgeons. Not only, because the rays fail to show a large percentage of stones, but because it emphasizes the calculous element of the affection and, if allowed to serve as an indication for operation, will deprive many of the early treatment which alone is scientific and safe.

Deaver[1], in an elaborate consideration of gall-stone disease, finds a marked relationship between gall-stones and chronic obliterative and chronic interstitial appendicitis. He does not incline to textbook teaching in gall-stone disease, believing that the lighter forms of dyspepsia with trifling epigastric pain must be regarded as suspicious. Gall-stones are merely the terminal stages and by no means the uniform accompaniment, or the most dangerous factor involved in gall-stone disease. Infection, not only as the cause of gall-stones, but of the local and systemic drainage of the disease, is the essential thing to recognize and treat.

Before considering cholecystostomy and cholecystectomy, we need observe the deductions made of the removal of the gall-bladder upon the human economy. For

[1] *Trans. Amer. Surg. Ass'n.*, vol. xxxiii, 1915.

this purpose we abstract the following from a paper by E. S. Judd[2], of the Mayo Clinic:

"The systemic circulation is probably the most important avenue through which infection reaches the gall-bladder. The only change in surrounding structures produced by removal is dilatation of the common and hepatic ducts and possibly the stump of the cystic duct."

Eventually this dilatation, with increased pressure, overcomes the action of the sphincter at the intestinal end of the duct and the bile passes through the duodenum with very little resistance. Judd believes this mechanism explains why the removal of the gall-bladder produces symptoms brought by inflammation in the pancreas, assuming that inflammation of the pancreas is caused by bile entering the pancreatic duct. Finally, the changes in the ducts which follow cholecystectomy indicate that the gall-bladder has a definite function.

What are the respective advantages of cholecystostomy and cholecystectomy? And what have been the results? What are the indications for the more radical operation?

We will condense the answers to these seriously important questions for the subject is one of great discussion among surgeons, although it would seem that the profession, as a whole, strongly favors removal of the gall-bladder.

In cancer of the gall-bladder; in serious trauma as by a gunshot wound; in serious crushing injuries or in occlusion of the cystic duct, the operation is cholecystectomy. Upon this all are agreed. The more conservative surgeons urge, when practical, retention of the gall-bladder, asserting that the passage of the bile for nutritional purposes, is far more important than the possible occurrence of adhesions following a cholecystostomy. Of this class, Halstead[3], of Johns Hopkins, is a conspicuous example.

Again, it is urged that in many affections simple drainage brings about happy results, and where quite a number of deaths are reported in cases of cholecystostomy, the mortality was high from some accidental cause that interfered with the general condition of the patient, and if such an operation proved a failure, it is always time to resort to a more radical procedure. Mayos reported some years since a series of 573 cases, exclusive of 101, in connection with common duct operations, a mortality of about 2.46 per cent. In the hands of skilled operators, in the absence of serious or malignant disease, the mortality is between 2 and 3 per cent. The Mayos report from 1907 to the end of the tenth month 1915, inclusive: Cholecystostomies, 2854 cases, 8 cancers, 44 deaths, mortality, 3.4 per cent. Cholecystectomies, 2493 cases, 13 cancers, 32 deaths, mortality 1.2 per cent. In skilled hands the mortality is eventually less in removal of the bladder, barring all dangerous general maladies.

All are agreed that some states of the body demand a cholecystostomy and that a cholecystectomy is contraindicated. These include some special cases of infection, perforation, great age, or some untoward symptom, making the choice of simple draining imperative.

The advocates of bladder removal—and they are many—urge that one operation upon the bladder is usually followed a few years later by another, that nearly all gall-bladders the site of gall-stones are either permanently diseased or become infected or are hard and useless in the body and that the bile-discharging function is permanently impaired through the occurrence of cholelithiasis.

They furthermore urge that so often the mucous membrane is so badly affected that papillary growths and cancer develop and the surest way to stop further infection is to remove the affected organ. This seems to be the consensus of a large body of abdominal surgeons, yet there are exceptions and Finney, of Baltimore, asserts that a gall-bladder should be removed when it is physiologically "down and out."

The operation of cholecystectomy in skilled hands shows a very small mortality. During the years 1916, 1917, and 1918, in all sorts and conditions of patients, the Mayos report 2,460 cholecystectomies with a mortality of 1.8 per cent.

In cholecystectomy, the all-interesting question is, "Shall we drain, or shall we not drain"

Again the profession is divided. Moynihan,[4] Richter,[5] Clark, Bottomley,[6] Willis[7] and a score of other experienced and able abdominal surgeons, urge strongly against the promiscuous use of drainage in abdominal and pelvic conditions, following the dictum as laid down by Moynihan: "Now, thanks largely to the work of Clark and others, who have studied the question with great care, we know that, when employed as a routine measure, drainage is rather a means of sepsis, than a measure of escape from its effects. Drainage of the peritoneal cavity is very rarely necessary."

During the World War the use of drains was rarely, if ever, employed and the results obtained by the omission of drainage is one of the strongest points in the removal of the gall-bladder without a drain. Willis[8] asserts that there is much exaggeration in the reports of persistent oozing of blood and the unwisdom of closing the wound without a drain. He reports a series of seventy-one cases with two deaths. At the necropsy of the two fatal cases, he says that there was no leakage from the stump of the cystic duct and he asserts, "I am thoroughly convinced that the surgeon who makes an impartial test will become a convert."

218 South Fifteenth Street.

[2] Judd, E. S., *Med. and Surg. Jour.* June 8, 1916 (abstracted).
[3] Halstead, W. S., *J. A. M. A.*, Dec. 20, 1919.
[4] Moynihan, G. A., *Abdominal Operations*, W. B. Saunders Company, Philada. 1905.
[5] Richter, H. M., *Surg. Gyn. & Obst.*, Nov., 1919.
[6] Bottomley, J. T., Boston, *M. & S. Jour.*, Aug. 19, 1920.
[7] Willis, A. M., *J. A. M. A.*, Dec. 8, 1917.
[8] Ibid, J. A. M., *J. A. M. A.*, March 12, 1921.

Eggs As a Source of Vitamin B

By extraction of egg yolk with water, Thomas B. Osborne and Lafayette B. Mendel, New Haven, Conn., secured a product comparatively rich in vitamin B, the daily dose required for a 100-gram rat being considerably less than that of the most potent dried yeast hitherto examined. The content of the egg yolk in vitamin B is not large, a daily intake of at least 1.5 gm. of the fresh yolk being required when it furnishes the sole source of vitamin B to a 100-gram rat. The whole egg is accordingly not exceptionally rich in vitamin B, when contrasted with other foods already investigated. Judged by the comparative trials on rats, the average sized hen's egg is equivalent in vitamin B potency to about 150 c.c. of cow's milk, or a quart of milk and six or seven whole eggs of the average sort have an approximately equivalent vitamin B value.—(*J. A. M. A.*)

Chronic Obstructive Jaundice (Noncalculous)

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Thoughts Concerning Gall-Stones; Cholecystostomy vs Cholecystectomy

A. WIESE HAMMER, M.D., F.A.C.S.

Philadelphia.

The past twenty years mark a memorable epoch in the field of abdominal surgery. Two decades have elapsed since a critical survey of gastric and hepatic affections have had applied to them the best surgical thought of both hemispheres; today we know well the surgical possibilities and the surgical limitations in both of these major divisions of abdominal surgery.

We have selected for consideration the gall-bladder, because of the great diversity of opinion among surgeons as to the treatment of gall-stones and allied affections and because the progress in this field has been constantly in the ascendant.

Twenty-five years ago the operations as done today would have been regarded as fanciful in theory and impossible in practice; today removal of the gall-bladder is a familiar operation and its removal without drainage is a most common occurrence.

The diagnosis of cholelithiasis is often beset with difficulties because of the analogous symptomatology with so many other abdominal affections. Indeed, it has been repeatedly shown that pain during the early hours of the morning awakening the sleeper may be the only signal announcing the existence of the malady.

Gall-stones in gall-bladders free from infection may give symptoms from obstruction, or from the movement from the passage of the stone, but in such instances there is lack of all gastric symptoms or, at least, such symptoms are not a major complaint. On the other hand, when gastric symptoms are evidenced, the presence of infection is assured. These gastric symptoms are present in infection of the gall-bladder, whether stones are present or not. Many of these patients who are free from infection may be cured by simple drainage.

Because of adhesion and fixation of the gall-bladder and consequent impairment of function due to the operation of drainage, a few of these patients may be liable later to cholecystitis. When infection is lacking, even if stones are present, the glands along the cystic, common and heptic ducts should be found but little enlarged on palpation. It is the consensus of very many of the best surgical minds that patients who suffer an infective condition of the gall-bladder should undergo the operation of cholecystectomy whether stones are present or not, since infection is the essential element.

Let it be said at the outset that colic may be present without the existence of stones and, *per contra*, the gall-bladder may contain calculi without the presence of gall-bladder colic. The reasons for this are easy of explanation.

The symptom which first suggests the presence of gall-stones is biliary colic which, however, is no absolute sign of an attempt at expulsion of a stone, since it may be the result of an inflamed gall-bladder or be recurrent and no gall-stone be present; and there may be no colic when gall-stones large enough to produce intestinal obstruction have escaped into the bowel.

The attack of colic is, in more than one-half the cases, followed in the course of a few hours by rigors and an elevation of temperature, frequently as high as 105° F., and the fever usually subsides with the cessation of the colic. It may be continuous, remittent or intermittent, and is an expression of the degree and the severity of the infection.

For many years surgeons overlooked cholecystitis without stones, these patients suffering from colic and mucous obstructive attacks with local tenderness. Often there was a better external appearance of the gall-bladder than in those bladders that were saved after removal of stones. Indeed, it was not uncommon (and not so many years ago), upon opening the abdomen and seeing that the gall-bladder looked "healthy" and upon palpation feeling no stones, not even to drain the gall-bladder. What was the result of this inaction? Almost invariably some subsequent operation was demanded, some of these patients at a later period developing gall-stones.

If cholecystitis is an infection of the gall-bladder from which bacteria can usually be cultured, then the lymphatic glands draining such an area should show evidence of such infection. The glands along the common, hepatic and cystic duct should be enlarged in such cases and if not affected, then some other etiological factors accounting for the condition should be searched for. These glands also drain the duodenum and the head of the pancreas, and the analogous symptomatology may find an expression in a pancreatitis, a pancreatic calculus, a duodenal ulcer, etc.

Another interesting point to be mentioned in connection with affections of the gall-bladder, is the association of papiliary growths springing from the mucous surface and later developing into carcinoma. The Mayos, in a series of different papers, lay great stress upon this fact and the statement is taken up by many able surgeons who are in perfect accord upon the likelihood of such a metamorphosis. Many surgeons assert that gall-stones predispose to cancer of the liver. It is asserted that 85 per cent. of the cases of cancer of the liver are metastatic and that fifteen per cent. or the remainder, which represent primary cancers, have their genesis in the gall-bladder or gall-ducts. Cancer of the liver, for instance, in impacted stone and possibly in papillary cholecystitis, is undoubtedly avoided by cholecystectomy.

A word as to x-ray diagnosis. At the present time the dependence placed upon the employment of the rays is not a popular measure among the vast majority of surgeons. Not only, because the rays fail to show a large percentage of stones, but because it emphasizes the calculous element of the affection and, if allowed to serve as an indication for operation, will deprive many of the early treatment which alone is scientific and safe.

Deaver[1], in an elaborate consideration of gall-stone disease, finds a marked relationship between gall-stones and chronic obliterative and chronic interstitial appendicitis. He does not incline to textbook teaching in gall-stone disease, believing that the lighter forms of dyspepsia with trifling epigastric pain must be regarded as suspicious. Gall-stones are merely the terminal stages and by no means the uniform accompaniment, or the most dangerous factor involved in gall-stone disease. Infection, not only as the cause of gall-stones, but of the local and systemic drainage of the disease, is the essential thing to recognize and treat.

Before considering cholecystostomy and cholecystectomy, we need observe the deductions made of the removal of the gall-bladder upon the human economy. For

[1] *Trans. Amer. Surg. Ass'n.*, vol. xxxiii, 1915.

this purpose we abstract the following from a paper by E. S. Judd[2], of the Mayo Clinic:

"The systemic circulation is probably the most important avenue through which infection reaches the gall-bladder. The only change in surrounding structures produced by removal is dilatation of the common and hepatic ducts and possibly the stump of the cystic duct."

Eventually this dilatation, with increased pressure, overcomes the action of the sphincter at the intestinal end of the duct and the bile passes through the duodenum with very little resistance. Judd believes this mechanism explains why the removal of the gall-bladder produces symptoms brought by inflammation in the pancreas, assuming that inflammation of the pancreas is caused by bile entering the pancreatic duct. Finally, the changes in the ducts which follow cholecystectomy indicate that the gall-bladder has a definite function.

What are the respective advantages of cholecystostomy and cholecystectomy? And what have been the results? What are the indications for the more radical operation?

We will condense the answers to these seriously important questions for the subject is one of great discussion among surgeons, although it would seem that the profession, as a whole, strongly favors removal of the gall-bladder.

In cancer of the gall-bladder; in serious trauma as by a gunshot wound; in serious crushing injuries or in occlusion of the cystic duct, the operation is cholecystectomy. Upon this all are agreed. The more conservative surgeons urge, when practical, retention of the gall-bladder, asserting that the passage of the bile for nutritional purposes, is far more important than the possible occurrence of adhesions following a cholecystostomy. Of this class, Halstead[3], of Johns Hopkins, is a conspicuous example.

Again, it is urged that in many affections simple drainage brings about happy results, and where quite a number of deaths are reported in cases of cholecystostomy, the mortality was high from some accidental cause that interfered with the general condition of the patient, and if such an operation proved a failure, it is always time to resort to a more radical procedure. Mayos reported some years since a series of 573 cases, exclusive of 101, in connection with common duct operations, a mortality of about 2.46 per cent. In the hands of skilled operators, in the absence of serious or malignant disease, the mortality is between 2 and 3 per cent. The Mayos report from 1907 to the end of the tenth month 1915, inclusive: Cholecystostomies, 2854 cases, 8 cancers, 44 deaths, mortality, 3.4 per cent. Cholecystectomies, 2493 cases, 13 cancers, 32 deaths, mortality 1.2 per cent. In skilled hands the mortality is eventually less in removal of the bladder, barring all dangerous general maladies.

All are agreed that some states of the body demand a cholecystostomy and that a cholecystectomy is contra-indicated. These include some special cases of infection, perforation, great age, or some untoward symptom, making the choice of simple draining imperative.

The advocates of bladder removal—and they are many—urge that one operation upon the bladder is usually followed a few years later by another, that nearly all gall-bladders the site of gall-stones are either permanently diseased or become infected or are hard and useless in the body and that the bile-discharging function is permanently impaired through the occurrence of cholelithiasis.

They furthermore urge that so often the mucous membrane is so badly affected that papillary growths and cancer develop and the surest way to stop further infection is to remove the affected organ. This seems to be the consensus of a large body of abdominal surgeons, yet there are exceptions and Finney, of Baltimore, asserts that a gall-bladder should be removed when it is physiologically "down and out."

The operation of cholecystectomy in skilled hands shows a very small mortality. During the years 1916, 1917, and 1918, in all sorts and conditions of patients, the Mayos report 2,460 cholecystectomies with a mortality of 1.8 per cent.

In cholecystectomy, the all-interesting question is, "Shall we drain, or shall we not drain"

Again the profession is divided. Moynihan,[4] Richter,[5] Clark, Bottomley,[6] Willis[7] and a score of other experienced and able abdominal surgeons, urge strongly against the promiscuous use of drainage in abdominal and pelvic conditions, following the dictum as laid down by Moynihan: "Now, thanks largely to the work of Clark and others, who have studied the question with great care, we know that, when employed as a routine measure, drainage is rather a means of sepsis, than a measure of escape from its effects. Drainage of the peritoneal cavity is very rarely necessary."

During the World War the use of drains was rarely, if ever, employed and the results obtained by the omission of drainage is one of the strongest points in the removal of the gall-bladder without a drain. Willis[8] asserts that there is much exaggeration in the reports of persistent oozing of blood and the unwisdom of closing the wound without a drain. He reports a series of seventy-one cases with two deaths. At the necropsy of the two fatal cases, he says that there was no leakage from the stump of the cystic duct and he asserts, "I am thoroughly convinced that the surgeon who makes an impartial test will become a convert."

218 South Fifteenth Street.

[2] Judd, E. S., *Med. and Surg. Jour.* June 8, 1916 (abstracted).
[3] Halstead, W. S., *J. A. M. A.*, Dec. 20, 1919.

[4] Moynihan, G. A., *Abdominal Operations*, W. B. Saunders Company, Philada, 1905.
[5] Richter, H. M., *Surg. Gyn. & Obst.*, Nov., 1919.
[6] Bottomley, J. T., Boston, *M. & S. Jour.*, Aug. 19, 1920.
[7] Willis, A. M., *J. A. M. A.*, Dec. 8, 1917.
[8] Ibid, J. A. M., *J. A. M. A.*, March 19, 1921.

Eggs As a Source of Vitamin B

By extraction of egg yolk with water, Thomas B. Osborne and Lafayette B. Mendel, New Haven, Conn., secured a product comparatively rich in vitamin B, the daily dose required for a 100-gram rat being considerably less than that of the most potent dried yeast hitherto examined. The content of the egg yolk in vitamin B is not large, a daily intake of at least 1.5 gm. of the fresh yolk being required when it furnishes the sole source of vitamin B to a 100-gram rat. The whole egg is accordingly not exceptionally rich in vitamin B, when contrasted with other foods already investigated. Judged by the comparative trials on rats, the average sized hen's egg is equivalent in vitamin B potency to about 150 c.c. of cow's milk, or a quart of milk and six or seven whole eggs of the average sort have an approximately equivalent vitamin B value.—(*J. A. M. A.*)

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The Peristaltic Gurgle in Obscure Malignancy

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It has been found that any alterations in peristalsis and consequent deviation from the normal gurgling heard over the abdomen has a clinical significance. In malignancy the peristaltic wave is altered, dependent to a certain extent, upon the location of the lesion. It may be said with a fair degree of certainty that the peristaltic gurgling, as obtained when a stethoscope is placed over the abdomen, is appreciably increased in carcinoma of both the intestines, stomach and adjacent structures.

In 1918 one of us (Boston) delivered an address upon this subject at the Lackawanna County Medical Society, of Scranton, Pa., and for the past twelve years this clinical feature has been observed in connection with cases of malignancy that have come into the medical service at the Philadelphia General Hospital.

D. C.—a meat cutter, age 55, was admitted to the hospital March 10, 1923, complaining of weakness and loss of weight. Family history negative, except over-indulgence in alcohol.

Chief Complaint

He had been annoyed by shortness of breath for the past two weeks, and attacks of palpation. Anorexia had persisted for at least five weeks. He recalled clearly the beginning of his illness five weeks before, when he suffered from what his physician regarded as an "acute grippe". He entered the hospital in the sixth week of this illness. His temperature reached 100° the third day in the hospital, and eight days later reached 104°, and remained irregular. It was above normal for a period of thirty days when it became sub-normal; and death occurred thirty-three days after admission.

Physical examination revealed an emaciated white adult. He was quiet in bed, co-operative, though mentally dull, sleeping most of the time. He had no discomfort nor pain. His skin was dry, rough and harsh, showing marked dehydration. Between the umbilicus and ensiform there were two intracutaneous cords, which were thought to be blocked lymphatics. He had marked pyorrhea and dental caries. Cervical glands were palpable. Abdomen was scaphoid, with slight generalized rigidity. There was no tenderness.

Peristalisis

Inspection of the emaciated abdomen gave evidence of peristalic movements through the thin abdominal wall. Auscultation over the abdomen revealed the following:—At the appendical region the number of fine and coarse (short and long) gurgles audible per minute varied between 60 and 90 (Normal for a man of his age 16-22). At the hepatic flexure and splenic flexure the gurgling was also above 60 per minute (normal 12 to 20); and at the umbilical region the gurgles were so frequent that it was impossible to count them. The patient was examined repeatedly and upon every occasion the peristalic gurgling was found to be 60 or more per minute. Auscultory percussion was employed by one of us (Becker) to outline the stomach, and this was found to be of normal size, but there was an apparent contraction at the centre of the organ;—an x-ray made later confirmed this finding.

Inguinal glands were not enlarged on admission but increased progressively as did also the cervical glands.

Laboratory Findings

Urine:—Acid, 1020, no sugar. Light trace albumin. Hyaline casts, 8 to 10 per low power field. Many leucocytes and cylindroids.

Feces:—Negative for occult blood, ova, parasites and starch granules. Triple phosphate crystals and much debris present. An occasional meat fibre was seen.

Blood urea nitrogen, 12 mgs. pe 100 cc. Blood Wassermann negative in all antigens.

Blood count—Hgb. 50% R. B. C., 2,920,000. W. B. C., 9,600 Polynuclears 80%. Lymphocytes, 15%. Mononuclears and transitionals 5%.

Summary of Laboratory Diagnosis

The presence of meat fibre in the feces suggests strongly the inactivity of the pancreas, and in a patient who has not been taking liberally of lean meats, this factor should not be overlooked.

The blood picture was that of a well marked secondary anemia. The existence of 80% polynuclear leucocytes supports the coexistence of some infection, which was also placarded by the presence of continuous fever.

X-Ray

Fluoroscopic examination immediately following a barium meal showed considerable retention at the cardiac end of the stomach. There was filling defect of the pars media and of the pars pylorica. Film made 5½ hours after barium meal showed considerable retention and a diagnosis of gastric carcinomia was given by the roetganologist.

Twenty-four hour film did not visualize the appendix. Particles of barium were seen in the hepatic flexure, also some in transverse colon and sigmoid. An x-ray study of the chest did not reveal any evidence of disease.

The clinical evidences available in the case of D. C. would be misleading, and the facts contributed but little if any data suggestive of gastric carcinoma. The x-ray findings were positive; a systematic study of the gurgling heard over the abdomen also gave evidence of abdominal malignancy.

This case is by no means an uncommon one and in instances where it is not possible to have the assistance of a roentgenologist's study, the sounds audible over the abdomen will give the most reliable, available, evidence in the diagnosis of obscure gastric carcinoma.

2024 Chestnut St.

PHYSICOTHERAPHY IN DERMATOLOGY, III.
Actinic Agents

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The actinic agents employed in treating the skin are represented by the Kromayer, Alpine, Uviol and Finsen lamps, and a certain alleged utility has been ascribed to the ordinary electric bulb. The first three are examples of the type of ultra violet light evolved from incandescent vaporized mercury. The Finsen lamp produces intense arc light rays cooled by running water, and a simpler modification on the same principle exists, known as the Finsen-Reyn lamp. The nature of ordinary electric bulbs needs no further word of explanation.

The Kromayer lamp is a water cooled apparatus, the source of light being metallic mercury sealed into a small crystal tube, roughly shaped like a duck's wishbone, the communication between the bent vertical limbs being horizontal rather than arched. There is also an air cooled variety on the market known as the Burdick lamp. The rays are applied to the skin either directly by means of different crystal applicators, or indirectly at varying distances from the surfaces to be treated. The length of the exposure, the intensity of the current, and the number of, and intervals between, exposures vary considerably.

The conditions in which the lamp has been employed are almost as many as there are skin diseases, but the success of this method of treatment has received no unanimous endorsement. Simple inflammations, chronic infections, certain diseases of the scalp and certain vascular diseases are among those which are said to have proved amenable to treatment by the Kromayer lamp. It is also useful in the management of some cosmetic defects. Its main value is in alopecia areata and in a rare condition known as angioma serpiginosum. The latter condition is so unusual that its treatment may be dismissed with a word. Suffice it to say that the procedure corresponds to the method employed in the management of port wine marks, to be described further on.

Alopecia areata is treated by applying the unfiltered rays under pressure over the affected sites, the exposures being from two to five minutes, at intervals of from one to two weeks. This produces vesiculation within a few hours to a day. The hair seems to grow in somewhat more rapidly than under other treatment, and often appears to be stimulated to growth in old, indolent patches that had been unsuccessfully treated by other methods.

In simple inflammations of the skin that are chronic, thickened and more or less scaly, such as isolated patches of psoriasis, the lichens and eczema, the Kromayer lamp is useful in hastening involution of the patches. It does not prevent their return, and is rarely as efficient as the x-rays. Sometimes, however, in cases in which the *x*-rays fail, the other method of treatment produces results. In dystrophies of the skin the lamp has no value, nor is it of value in the treatment of benign tumors and malignant tumors.

It is alleged to be of use in the treatment of cutaneous tuberculosis. In my experience it is not to be compared with the *x-rays* in this condition, nor with the Finsen light in lupus vulgaris. On the other hand, in erythematous lupus it has a certain value in the chronic discoid type, but from time to time it seems to stimulate such cases to dissemination and thus a certain risk is involved in its use. When employed in tuberculosis it should be used unfiltered under pressure for ten minutes once every seven to ten days. In lupus erythematosus it is similarly applied, but for a shorter period.

In treating port wine marks the light is employed unfiltered and with pressure for fifteen to thirty minutes once every three or four weeks to each area. The number of treatments necessary is determined by the size and depth of the lesion. It is desirable to produce deep vesiculation. From one to three years are required to produce involution of such a nevus.

In the field of cosmetics the lamp is of use in pitted scars following chicken-pox, small-pox, and acne. Vesiculation is produced and the scars appear to grow shallower after repeated treatments. The Kromayer lamp is also valuable in the treatment of conditions due to pigmentary disturbances such as vitiligo, and a passable result may occasionally be obtained by its use in this disease. There are numerous other conditions, both organic and cosmetic, in which isolated reports of benefit exist. On the whole these are too scattered to warrant far reaching conclusions. So far as dermatology is concerned the Kromayer lamp may be regarded as having a limited range of utility, the conditions in which it is specifically indicated responding to it better than to other forms of theraphy.

The Alpine lamp is useful in treating alopecia areata and loss of hair due to seborrhoea of the scalp, and possibly in those forms known as baldness following fevers. In all of these conditions the exposures to the various areas last from five to twenty minutes and should be made every ten days to two weeks. These factors are determined by the speed of recovery and the individual susceptability of the patient to the rays. Angioma serpiginosum is also responsive to this type of light.

The Uviol lamp is based on the principle of the Cooper-Hewitt light. Formerly this apparatus was widely used abroad in the treatment of many scaling dermatoses, particularly psoriasis.

The Finsen lamp is employed entirely in the treatment of skin tuberculosis, especially lupus vulgaris. In Europe where this disease is common and constitutes a real social problem there are institutions for the administration of the treatment in question. Such exigencies do not exist in the United States, and here the x-rays are employed where the Finsen light would be used abroad. Unquestionably the latter is more useful in this group of conditions.

780 Madison Ave.

Tumors of the Breast

William D. Haggard and Henry L. Douglass, Nashville, Tenn., have collected, from their clinic, for the eleven years ending January 1, 1922, 255 histories of breast lesions. The findings in these 255 cases may be summarized thus: (1) No malignant tumor of the breast occurred in a woman under 27. (2) The average age of patients with cancer of the breast was 49.2 years. (3) In cases of recurrent carcinoma, the patients were five years younger than in the primary cases. (4) All sarcomas occurred in males, and constituted 2.4 per cent. of the malignant cases. (5) In only one-third of the malignant cases was there a family history of cancer. (6) In two-thirds of the cases in which the lesions were benign, the patients gave a positive family history for cancer which probably caused them to apply for examination even though their lesions were benign. (7) The average duration of cancer before operation was twenty-six and one-half months. (8) One case in five was inoperable. (9) Patients with benign lesions had an average age of 36.1 years, which was thirteen years younger than in the malignant cases. (10) The average duration was fourteen months, as against twenty-six and eight-tenths months for carcinoma cases. ((11) From five to ten year cures in 111 traced cases of operation for cancer of the breast occurred in 45.7 per cent. (12) The preventable surgical mortality was 0.8 per cent.—(*J. A. M. A.*)

Diagnosis and Treatment

Two Hundred Syphilitic Patients Whose Chief Complaint Was "Stomach Trouble"

John H. Stokes and Philip W. Brown made a summary of the 200 syphilitic patients who complained of stomach trouble, which showed that 70 per cent. had neurosyphilis, 20 patients (10 per cent.) had organic lesions (syphilitic or non-syphilitic) of the gastro-intestinal tract, 9 (5 per cent.) had lesions of the heart, and only 4 per cent. had true syphilis of the stomach. Sixty per cent. of the men and 70 per cent. of the women could not give histories of secondaries. In only 36 per cent. of the whole series of patients was syphilis recognized before they came to the clinic. The medical diagnosis before their examination in the clinic were apparently largely based on history (90 per cent.) and blood Wassermann reaction (65 per cent.). After examinatin in the clinic the diagnoses were based on history (60 per cent.), spinal fluid examination (59 per cent.), and blood Wassermann reaction (44 per cent.). Only 10 per cent. of the patients had had spinal fluid examinations before coming to the clinic, yet 59 per cent. were positive. *The examination of the spinal fluid deserves greater popularity.* Only 44 per cent. of the patients gave a positive Wassermann reaction when they entered the clinic and 56 per cent. gave negative reactions largely as a result of treatment elsewhere. Negative blood Wassermann and negative spinal fluid do not exclude neurosyphilis as a cause of gastric complaints. Eighteen per cent. of our patients with stomach trouble had had needless operations, 80 per cent. before entering the clinic. In all but 2 of 35 patients there were clues to the underlying syphilis which were not followed up, or a negative blood Wassermann reaction that had been accepted as final, when other evidences of syphilis could have been found. A general raising of the "index of suspicion" for syphilis among internists and surgeons would reduce operative mistakes on patients with abdominal symptoms. A blood Wassermann is often insufficient to clarify the situation, but should at least be routine. Positive Wassermann reactions before operation should not be ignored. In the 109 cases which remained for treatment 70 per cent. improve, 43 per cent. were relieved of their complaint. Different methods of treatment will be required for underlying syphilis of the nervous system, the stomach, or the heart. The spinal fluid examination stands out as a procedure of the highest importance, outranking the serum Wassermann reaction in diagnostic syphilology as applied to internal medicine. A plea is made for its wider use for diagnosis and for proper facilities for its performance and control.—(*Am. J. Med. Sci.*, Dec., 1922.)

An Analysis of 10,628 New Jersey Reports of Gonorrhea and Syphilis

A. J. Casselman, M.D., says more than one per cent. of all the unmarried men between the ages of 20 and 25 are reported each year as infected with gonorrhea or syphilis. Venereal diseases are reported more frequently among unmarried than among married men; but in women the proporton is reversed, married women are reported as infected more frequently than single women. The ratio of venereal infections between the single and married males is about two to one, and this ratio is reversed among the females. This analysis indicates that there is needed some procedure which will tend to prevent the marriage of persons suffering from a venereal disease in an infectious stage.

It may also be concluded, according to the author, that if venereal disease control is to be made effective, physicians must be induced to discover, whenever possible, and include in the data reported to the state department of health, the specific source of the particular infection. Without disclosing the name of the patient who is reported, the state department can turn over to the local board of health having jurisdiction the name of the person given as the source of infection. This person may then be induced by the local health officer to seek physical examination and treatment. This should prove an effective means of bringing under treatment especially those women who do not now seek treatment for gonorrheal infections.—(*U. S. Public Health Reports*, Vol. 37, No. 43, October 27, 1922.)

The Wassermann Test. Wassermann Tests in a Boston Maternity Hospital

David L. Belding and Charlotte B. Adams made Wassermann surveys upon hospital or dispensary patients who suffer from various pathological conditions, including syphilis, do not represent the normal incidence of syphilis or the true percentage of positives among the so-called healthy population. It is a matter of common knowledge that the Wassermann test, based on a non-specific fixation, does not detect all cases of syphilis. Negative tests are frequently obtained in syphilitics, particularly in old or treated cases, and infrequently positive reactions are obtained in other diseases. The Wassermann test, the most reliable method at our command for determining the existence of syphilis, does not represent the actual extent of the disease in a community. In the author's experience the close results with the same antigen, cholesterolized beef heart, suggests that the actual technique of performing the test is perhaps less important than the type of antigen and the method of reporting.

In 5,198 routine cases in a Boston Maternity Hospital, the Wassermann test showed some degree of positivity in 9.2 per cent., was definitely positive in 7.8 and strongly positive in 4.6.

Only 9.8 per cent. of the positive cases gave definite clinical evidence of syphilis, although an additional 19.9 showed suspicious findings.

Positive Wassermann tests, with cholesterolized antigens, in pregnant women are not comparable to similar tests in non-pregnant, and therefore do not either represent the actual incidence of syphilis in a community or the per cent. of positive tests in healthy non-pregnant women.

Statistical studies from various cities cannot be accurately compared, owing to differences in technique and material. For reference all Wassermann surveys should be accompanied by a statement of the method of performing the test and a descriptoin of the status of the patient.

Owing to longer exposure, the per cent. of positives increases with age and length of married life.

The high incidence of syphilis in the negro, twice that in the white race, necessitates the exclusion of this race in certain statistical comparisons. The prevalence of syphilis varies with different nationalities.

The per cent. of positives increases inversely as the wealth of the patient, and also differs according to occupation.

In Boston the urban rate is higher than the suburban and the highest class residential districts show the lowest per cent. of positives, which, in this instance, explains the lower suburban rate.—(*Bost. M. & S. Jour.*, Dec. 7, 1922.)

Staphylococcus Infections of the Face and Lips

That staphylococcus ("furuncular" and "carbuncular") infections of the face and lips—especially of the upper lip and the naso-labial region—sometimes prove rapidly fatal, through cavernous sinus thrombosis or more distant septic dissemination, is a fact probably generally known in medicine; and the wise physician will be cautious in prognosis, however insignificant such an infection may, at the outset, appear to be. What the percentage of fatalities in these infections is it is obviously impossible to determine. In *Annals of Surgery*, July, 1922, Walton Martin, of New York, records that, at St. Luke's Hospital, of seven patients with extensive infections of the lip six died; another, observed elsewhere, recovered. Of course, however, it is only those cases that develop unfavorably that are brought to hospital; and Martin notes that there were many cases of small furuncle of the face, treated in the out-patient department and not included in his study—which he undertook in an effort to determine why certain cases of staphylococcus infections of the face and lips are fatal. Concerning this, he says:

My own views are that although furuncles and pimples of the lips and face are very common and usually subside, even when they are squeezed, pressed, pricked and punctured, these are dangerous measures to apply to any infection and are especially dangerous in the lip. The knowledge should be widespread that every furuncle of the face and nose, and especially of the lip, should be treated as if it might become a dangerous disease. It should be more generally recognized that danger lies in a complicating suppurative thrombophlebitis, and that mechanical injury, the arrangement of the labial plexus of veins and the inevitable movements of the parts are factors of great consequence in spreading infection.

I believe that early operations and rough manipulations in the infected area tend to spread the infection. The small infection should be kept at rest, the skin about it gently cleansed and covered with some simple ointment. The focus of infection should not be rubbed or squeezed or pricked or handled. It is dangerous to try to abort furuncles by puncture through the white or red point with a toothpick or wooden applicator dipped in phenol, nor should phenol be injected in the indurated tissue. Early puncture before there is a definite focus of suppuration and then tightly packing the small hole to arrest bleeding is admirably suited to crate conditions in the dense tissue of the lip favorable for rapid bacterial growth and the spread of infection to the labial veins.

Considerable induration about the focus of infection and edema of the loose cellular tissue of the eyelids is not uncommon in moderate infections and is not a sign of ophthalmic phlebitis.

While it is not clear what is accomplished by merely gently cleansing the skin and covering with some simple ointment, it is clear that "rough manipulations in the infected area may spread the infection, and Martin has done a service in calling attention

to its dangers and to the possible dangers of injecting bad local anesthetics when incisions are necessary. Whether or not early operation in these cases deserves to be condemned in the same sentence with rough manipulations, and for the same reason, will probably be debated; and the decision cannot be reached without determining what is meant by early operation. It is quite conceivable that an incision extending through the protecting zone of leucocytes may spread the infection. Considering the possibilities of danger in these cases, however, the surgeon will have to decide in each case whether it is or is not wiser to incise the lesion; and he will probably decide according to its character and, especially, according to whether or not pus has formed. Speaking of furuncles in general, we are of opinion that usually they require no incision or, at most, only a small incision sufficient to permit the escape of the "core." The early evacuation of the slough or core, i. e., as soon as it is loose, by extraction with delicate forceps or even—and in spite of the generally accepted dictum—by gentle expression, is the best means of terminating the suppuraiton and the pain. Sloughs, like bone sequestra, maintain suppuration and encourage its spread. When all sloughs have escaped, or have been removed, from a furuncle suppuration ceases and healing begins.

In spite of definitions, one cannot always draw a dividing line between large *furuncles* and small *barbuncles* (the term *carbuncular furuncle*, as used in Keen's Surgery, Vol. 1, is quite descriptive), nor between these and some superficial *phlegmons*. These conditions are all produced by the same organism, involve in varying degree the same tissues, and are pathologically not very different. (Martin's eight cases were all "examples of the condition we usually call carbuncles.") What then are "the conditions which change a single circumscribed staphylococcus infection into a widespread and dangerous lesion?" We are quite prepared to agree with Martin in "the conclusion that many such simple lesions are often so changed by ill-advised treatment at the onset of the infection." Since, however, as Martin shows in the literature quoted, deaths have been attributed both to incision of the primary furuncle and to failure to incise it, the rule cannot be accepted that furuncles of the lip, nose, face should never be incised nor can deaths following such incision properly be attributed to it. A more important factor in determining the outcome is, probably, the virulence of the infection itself or—what perhaps amounts to the same thing—the resistance of the individual.—(*Am. Jour. Surg.*, August, 1922.)

A Case of Tuberculous Enteritis Treated by Intra-Peritoneal Injections of Oxygen.

John L. Jelks, of Memphis, Tenn., reported to the American Proctologic Society this case and the result of treatment because of the apparent hopeless condition, the little post-operative discomfort occasioned, and the immediate improvement and rapid cure from two injections; and also because the treatment and result are both contrary to the ideas conveyed by laboratory study of the tubercle bacillus. The free fluid was first withdrawn through a canula which was fixed by a purse string suture. The quantity of oxygen was measured only by the tolerance of the patient, as indicated by no undue embarrassment of respiration. The incisions down to the peritoneum were made in each treatment under novocain analgesia without pain. The patient felt a sense of well-being and buoyancy, the diarrhoea, which had amounted five to thirty dejections daily was immediately controlled, the temperature became normal, and even the lung lesions rapidly cleared; and the woman is now reported by the internist and the attending physicians of the sanitorium for tuberculosis as entirely well. Whether the results were obtained by stimulation of the endothelium with oxygen, by increase of antibodies in the supersaturated blood and tissues, or by direct effect on the tubercles, the writer offered as suggestion and food for thought.

Tumors of the Breast.

Peck and White have reviewed the findings in 331 breast tumors, the majority of these cases having occurred in the Second Surgical Division of Roosevelt Hospital. 136 were benign and 195 malignan tumors and their study of the former have led them to believe that benign tumors or cysts can be definitely diagnosed at the operating table in a high percentage of cases and should be treated by conservattive surgical procedures. Mutilating radical operations for such conditions are unnecessary and are a confession of ignorance or timidity on the part of the surgeon. A trained pathologist should be present at the operating table to assist the surgeon in determining at once the nature of the pathologic process. Cysts of the blue-domed type and localized and generalized chronic mastitis are neither malignant nor precancerous conditions and should not be considered. Non-encapsulated tumors of the adenomatous type form a borderline group. They are by no means always precancerous lesions and in younger women radical operations should be avoided if possible. In older patients, and when the amount of breast tissue involved is considerable, radical operation may be indicated. Multiple primary tumors or cysts are rarely malignant. Possible exceptions to this rule, e. g., a carcinoma developing in a breast already the seat of a benign tumor, have not been observed in this series. This rule does not apply to advanced cases of carcinoma with outlying nodules which are really secondary deposits. Conservative operations should, when possible, preserve the contour of the breast, and incisions should be so placed as to leave an inconspicuous cicatrix. The curved incision at the lower border (Warren) best meets this requirement. Carcinoma later developed in two of these patients, but in both cases the primary operations had been of the complete radical type. (*Annals of Surgery*, June, 1922.)

Lipoma of Tendon Sheaths

Strauss says the only treatment for lipoma of the tendon sheaths is ablation. In removing the growths, it is necessary to remove much of the sheaths. This, however, causes no post-operative complication, either in healing or in function. When the tendons tunnel through the lipomatous growths, very careful dissection is necessary to avoid cutting them. The author prefers the block method of local anesthesia described by Braun. This enables the patient to aid the operator by moving the tendons at will until the motor power is also affected by the anesthetic. This, however, is lost only after the sensation is lost and returns before sensation. In the author's second operation the patient had no sensation in the back of her hand until 6 hours after the injection was made. Sometimes massage is given for a time following the operation, but this is not always necessary.

The prognosis is good for complete return of function, and the growths do not recur.—(*Surg., Gyn. & Obst.*, Aug., 1922.)

Studies in Asymptomatic Neurosyphilis

Keidel and Moore present a tentative classification of early asymptomatic neurosyphilis. Diagnosis depends on information derived from spinal fluid studies only, but the prevalence of persistently positive blood Wassermann reactions in treated cases and incidence of minor pupillary abnormalities—headache, lassitude, rheumatic pains and nervousness are noted. The treatment of early asymptomatic neurosyphilis is so intimately dependent on the interpretation of cerebrospinal fluid findings that the two cannot be considered separately. The incidence of neurosyphilis during the period of general invasion is the strongest argument in favor of the adequate treatment of all syphilis.

In series of 151 cases of primary and secondary syphilis, the influence of treatment as indicated by changes in the cerebrospinal fluid was studied. Effective therapy reduced incidence of asymptomatic neurosyphilis from 26.3 to 3.2 per cent. After twelve or less doses of arsphenamin and courses of mercury, the spinal fluid showed abnormalities in 21.4 per cent., while after eighteen or more doses of arsphenamin plus mercury the percentage dropped to 5.7.

Classification of Early Asymtomatic Syphilis:

Group 1. Normal fluids. Great majority remain free from late clinical or serologic evidence of neurosyphilis.

Group 2. Neurologic damage minimal or questionable. Patients do well on routine treatment without the addition of intraspinal therapy.

Group 3. Tissue invasion moderate.

It is probable that changes of this type represent future meningo-vascular cerebrospinal syphilis, though a minority of patients may develop parenchymatous neurosyphilis—paresis and tabes.—(*Arch. Neur. and Psych.*, September, 1921.)

Observations on the Kahn Precipitation Reaction

The precipitation test for syphilis proposed by Dr. Kahn, of the Michigan Department of Health, is a simple reaction obtained by a mixture in given proportions of patient's serum and an antigen, says Janet A. Holmes. Should this test prove equal in sensitiveness to the Wassermann, its superiority to the latter reaction becomes obvious. The following is a report on 131 cases seen in the Washington University School of Medicine, according to the technique outlined by Kahn.

Two rows of tubes were set up in a rack, the first row containing .3 c.c. of inactivated patient's serum and .05 c.c. cholesterin antigen. The second row containing .3 c.c. patent's serum and .05 alcoholic antigen. Controls were used. The rack was shaken for three minutes and incubated overnight at 37 degrees. In the morning positive sera showed marked clumping; negative sera remained clear. The scale of reading can be made parallel to the familiar four, three, two and one plus of the Wassermann. The following table gives the comparative results of 131 cases with

the regular Wassermann and the same 131 cases with the Kahn test:

Wassermann .....positive)	30	
Kahn .....positive)		
Wassermann .....negative)	94	
Kahn .....negative)		
Wassermann .....negative)	7	
Kahn .....positive)		
Wassermann .....positive)	0	
Kahn .....negative)		

It will be noticed there is a disparity in seven cases. In these cases the clinical evidence supports the Kahn test as against the Wassermann.

The number of tests run is too small as a basis for conclusions, but results obtained to date are sufficiently significant to warrant further investigation.

There have been various tests proposed as a modification of, or an improvement upon, the original Wassermann reaction, but very few have justified continued use. The Kahn precipitation reaction is a simple test which bids fair to supplant the Wassermann instance, and in the cases where it differs the clinical history has been in favor of the former test. If the Kahn reaction is proven to be what its originator claims for it, it would mean that the general practitoner could do this simple test in his office with little equipment and trouble, and little necessity for technical knowledge.—(*Proc. Washington Univ. Med. Soc.*, October 9, 1922.)

Child Takes Tuberculosis from Diseased Cattle

A test recently concluded by Dr. E. C. Schroeder, of the United States Department of Agriculture, traced tuberculosis in a child directly to bovine tuberculosis. The history of the case is as follows: During the latter part of October, 1922, a tuberculin test was applied to a herd of 12 dairy cows. The test was made at the owner's request under the plan conducted by the State and Federal officials working co-operatively. As a result of the test 11 of the cows were classed as reactors, and upon autopsy all revealed lesions of tuberculosis, two being advanced cases. The veterinarian who made the test was informed by the owner that his 8-months-old baby girl had recently developed a swelling in her throat which was being treated by their family physician. The child had been fed on the milk of the infected herd for about 7 months, and the physician believed that the enlargement in her throat was tuberculosis of bovine origin. The attending physician soon afterward decided that an operation to remove the diseased tissue was needed. As a result of the operation the child is recovering.

A part of the diseased tissue was forwarded to the experiment station of the Bureau of Animal Industry, United States Department of Agriculture, located at Bethesda, Maryland. On microscopic examination it was found to contain bacteria which looked precisely like tubercle bacilli, and these were proved beyond question to be tubercle bacilli of the bovine, or cattle, type.

The case described is particularly interesting, not because tuberculosis is of rare occurrence among children, but because the disease in this instance was traced to the very cows from which the infection emanated.

Conservatively estimated, bovine tubercle bacilli, or the type with which the milk obtained from tuberculous dairy herds is apt to be contaminated, are responsible for about 10 per cent. of the deaths due to tuberculosis among children under five years of age, and for many cases of tuberculosis which do not end fatally but often leave their victims permanently scarred or crippled.

The Physician's Library

Sexual Impotence—By William J. Robinson, M.D., Chief of the Department of Genito-Urinary Diseases and Dermatology, Bronx Hospital and Dispensary. Eleventh Edition, revised and enlarged, 502 pages. New York: Critic and Guide Co., 12 Mt. Morris Park W.

The eleventh edition of this very excellent book shows the addition of new chapters dealing with gland transplantation, endocrinology, the Steinach operation, together with new case reports. In a previous review of another edition we said that Robinson had "evolved a volume full of meat and of great value to the physician" and this can be said of the present book. It is better than its predecessors, which is saying much.

Men interested in this line of work (and practically all practitioners are) should read this new edition.

Exercise in Education and Medicine—By R. Tait McKenzie, M.D., LL.D., Professor of Physical Education and Physical Therapy and Director of the Department of Physical Education, University of Pennsylvania. 601 pages, with 445 illustrations. Philadelphia and London: W. B. Saunders Company, 1922.

This book shows the value of exercise in every branch of the practice of medicine, as well as in the education of youth. Its author is one of the leading exponents of physical education in this country. We commented most favorably on the previous edition. This book has added value because, since the appearance of its predecessor, Dr. McKenzie has had a most valued experience in the Medical Corps of the British Army. He served in various camps and hospitals in England, Canada and the United States and, as an instructor, was able to gain a tremendous amount of new ideas regarding the value of exercise, particularly for wounded men.

There is hardly a phase left uncovered in the pages of this book, so that it is one which makes a distinct appeal to every type of practitioner and educator.

Doctor and Patience—By Harold N. Hays. Cloth, 290 pages. Boston: Cornhill Publishing Co., 1923.

The readers of THE MEDICAL TIMES will be interested in the announcement of the publication in book form of the intensely interesting serial which ran through our columns in 1921. "Doctor and Patience" was not, as some people seemed to think, a personal review of the gifted author's early career. It was rather the setting down of his very careful observations, together with some of the wisdom which he seems to intuitively possess.

Every young doctor, who is not long in practice, should have this book because, if he will profit by its teachings set forth in an interesting story form, he will be far better professionally, financially and spiritually.

Dr. Hays has performed a real service in bringing these various phases to the attention of the profession and we bespeak the consideration of medical men for this most delightful and instructive story.

Impotency, Sterility and Artificial Impregnation—By Frank P. Davis, M.D. Second Edition, 168 pages. St. Louis: C. V. Mosby Co., 1923.

Some additions have been made to the previous edition of this book. The name very well sets forth the character and contents of the volume. For physicians who have cases coming under these categories, the book will be found of great interest. The subject is well presented.

The Successful Physician—By Verlin C. Thomas, M.D., of San Francisco. 303 pages. Philadelphia and London: W. B. Saunders Company, 1923.

If one were to follow out all the dictates laid down in this volume one could not help developing into a highly successful practitioner. The author has covered the business side of the practice of medicine most thoroughly and has set forth precepts which all physicians would do well to follow. The book is intended, we suspect, primarily for young physicians, but there is so much sound common sense within its covers that all medical men would do well to read it and profit thereby. A good deal of the material would not interest the practitioner who is safely settled in an established practice, but there are other ideas set forth which would mak it entirely worth his while to become familiar with it. The author has treated a somewhat difficult subject in an interesting and instructive manner and, by so doing, has performed a useful function.

Merck's Manual of Materia Medica—5th Edition; 581 pages New York: Merck & Co., 1923.

The purpose of this manual is to present in abbreviated form all the data the physician may desire to have on Materia Medica. It is a very excellent reference book and one which will appeal to the busy practitioner. There are four parts devoted respectively to drugs and chemicals; therapeutic indications; classification of various medicinal agents, according to their physiological action, and a section devoted to poisoning and its treatment with a dose table, charts, etc. The book is one which has a great deal of practical value.

An Improved Procedure for the Staining of Acid-Fast Organisms in Tissue

A method which affords a rapid and simple technic for demonstration of *Bacillus leprae* and *Bacillus tuberculosis* in tissues is described by Benjamin H. Hager and Rose Derach, Rochester, Minn. Excellent results are also obtained in paraffin sections.—(*J. A. M. A.*)

The Medical Times

A MONTHLY JOURNAL
OF
Medicine, Surgery and the Collateral Science
ESTABLISHED IN 1872

EDITED BY
H. SHERIDAN BAKETEL, A.M., M.D., F.A.C.P.
ARTHUR C. JACOBSON, M.D.
Associate Editor.

Contributions.—EXCLUSIVE PUBLICATION: Articles are accepted for publication on condition that they are contributed solely to this publication.

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All communications should be addressed to and all checks made payable to the publishers.

MEDICAL TIMES CO.
ROMAINE PIERSON, *President*
H. SHERIDAN BAKETEL, *Treasurer*
GEORGE B. CREVELING, *Secretary*
95 Nassau Street - - - New York

NEW YORK, JULY, 1923

The Average Mind

In the light of the army statistics regarding American mentality it was estimated that the age of the average American is about thirteen, in other words, the same as that of the average soldier. This was questioned, because of apparent fallacies in the reasoning, but now the researches of Symonds show that this estimate was correct, for he has found the mental age of the average American to be 13.2 years. Symonds' researches involved tests of large numbers of men in various occupations—transportation, trade, public service, professional, domestic service and clerical groups.

It is therefore now being argued that it is a waste of money to attempt the education of persons of this low mental grade. The recent report of the Carnegie Foundation called seriously in question the wisdom of continuing our public schol system. Walter Lippman seems to stand alone in his belief in education for the masses, and has contributed a very able article on the subject to the May *Century*.

We can at any rate say that enlightened political proposals run considerable risk when submitted to popular suffrage. But so long as this country remains a republic and not a democracy there is not much danger to be apprehended on that score. Successful advertising must of course be addressed to the moron mind. So also the newspapers must remain upon a low plane. The possibilities of propaganda are simply limitless; the staging of wars should be especially simple. Organizations of Ku-Klux type should thrive mightily.

In this light the extent to which personal hygiene can be developed among the masses is a doubtful matter. Public health experts are agreed that a further reduction in our mortality rates hangs upon this point.

Harassing Morons

Dr. Arthur W. Booth, President of the Medical Society of the State of New York, struck the nail exactly upon the head when he said, in the course of his address before the recent annual convention of that organization, that the functions of the physician are entering more and more under the control of fanatics of the moron type.

The more one sees of the principles and practices of these fanatics the more it is borne in upon one that they are indeed of the moron type.

"Some of the more extreme antagonistic legislation directed toward restricting the exercise of professional skill indicates how far the functions of the physician are entering under the control of the fanatic, the culpably ignorant and the moron type. It is difficult to enlist the aid of intelligent laymen, who seem bewildered and entranced by the emotional gestures now so prevalent and remain oblivious to the deeper changes and sinister influences threatening civilization, as manifested by the growing disrespect for law, medicine and moral standards."

We are inclined to question the term "intelligent laymen" in the foregoing quotation from Dr. Booth's address. It seems to us quite obvious that there is a moronic element to be reckoned with even in these people. They are the dumbbells that have been revealed by psychologic studies of the general population—people who pass as intelligent, who are very often among our most successful business men, and who are educated in the conventional sense.

It is no new thing for us to insist that most of our political and social problems are greatly clarified if the facts regarding group intelligence are kept in mind. We used to point this out long before the psychologists confirmed our opinions by their large-scale work.

Scotching a Red Herring

In the Governor's memorandum accompanying his approval of the legislation repealing the Mullan-Gage law, the following passage is of particular interest to physicians:

> The repeal of the Mullan-Gage law will put the State in harmony with the recent decision by United States District Judge Knox declaring a portion of the Volstead act to be in contravention of the Eighteenth Amendment. By that decision the United States District Court in New York has laid down the principle that the prohibition contained in the Eighteenth Amendment does not apply to the necessary and proper prescription of alcoholic liquors for medicinal purposes and that the Federal Government gains no power under the Volstead act except to prohibit traffic in alcoholic liquors for beverage purposes as distinct from medicinal purposes. Provisions of the Mullan-Gage law, if left in force, would still maintain in the law of this State the limitatons contained in the Volstead act which the great body of the medical profession in our State seems practically unanimous in denouncing as an interference with the necessary requirements of their profession.

Another milestone has been passed on the road leading to a restoration of our rights as practitioners.

Mostly to be regretted about such a struggle is the waste of time and energy when really vital issues remain unsettled and even untouched. The enforcement issue looks sometimes like a red herring drawn across the trail by those who hope to postpone the day of reckoning.

Exorcising Fear

At the recent convention of advertising men in Atlantic City a competent observer who had studied European conditions very carefully expressed the conviction that further wars were inevitable, and declared that eleven nations were feverishly preparing for such conflicts. The psychological background was one of demoralizing fear and uncertainty.

If wars are inevitable, and if fear and uncertainty are resolved by the advent of war, it might be well to set definite dates for the outbreaks, and designate the parties to the conflicts. Alleged causes always exist or can be easily staged by propagandists. Why not do away with all the annoying jockeying?

Empiricism Still Useful

Roentgen-ray therapy in whooping cough, at the hands of Boston clinicians, has produced apparently beneficient results. The method seems to have been applied empirically. Certainly no explanations as to the why and how of the thing have been submitted.

We therefore feel at liberty to imagine further possibilities in this line, particularly with respect to bronchial asthma, that other spasmodic respiratory affliction.

We suggest that our Boston colleagues and roentgenologists in general consider this vastly important field.

If the victims of this distressing malady can secure relief empirically, like the little sufferers from pertussis, they will not exact any exhaustive explanation.

Population and Spiritual Values

Is it not the overproduction of human beings which accounts for our contempt for human life and the relative worship of property? If one imagines a society greatly reduced in numbers and civilized by culture because of birth control, one can readily conceive in what high respect human life would be held.

The critics of birth control lay stress upon the alleged disregard, on the part of its advocates and practitioners, of human life, but it would be only in a society brought about by the application of birth control principles that human life would be at least as sacred as property.

Human life is now cheap simply because of quantity production. This accounts for the carnage which we tolerate in our city streets and on our industrial battlefield, and also for the ease with which we can be inducted into war.

Miscellany

CONDUCTED BY ARTHUR C. JACOBSON, M. D.

From a Cathechism of the Electronic Methods of Dr. Albert Abrams

"Why can a drop of blood reveal conditions often unperceived by an examination of the body? The blood drop with its countless millions of electrons is a condensation of the multitudinous vibrations in the body. The mineralogist finds it unnecessary to examine a mine to determine the nature of its products. It is unnecesary to perceive a magnet to detect its energy nor a dynamo to measure an electric current. With a spectroscope one may detect the millionth of a milligram of matter and even invisible objects may now be detected by heat radiations. The fundamental problem of astronomy is to determine the nature and composition of celestial bodies. Now, these bodies cannot be brought to the laboratory for analysis, but the energy which they emit (light and heat rays) may be investigated by the spectroscope and the knowledge thus furnished is as accurate as if a sample from some distant star were tested with chemical reagents. This method of radioanalysis was commenced more than one hundred years ago and is practically the same method which is now pursued by the E R A (electronic reactions of Abrams)."

It is a good method, and one which has been expanded by the profession to a point where it is not necessary to meet Dr. Abrams in order to arrive at a correct assay of his wares.

Heredity

Edwin Grant Conklin thinks it is difficult if not impossible to determine the relative importance of environment, education and heredity. Myerson suggests that the laws of Mendel do not apply to human inheritance for the reason that such conditions of in-breeding as were carefully observed in the Mendelian experiments do not prevail among human beings. The eugenists can speak authoritatively only upon physical inheritance; social inheritance is another story, and has not the unalterable character of traits transmitted through the germ plasm. Graham Wallas (Our Social Heritage) has emphasized the effects upon man's habit formation of our great body of social tradition, and this inheritance must be reckoned with as well as the purely environmental effects of education, religion, government and social intercourse.

Who Are the Unfit?

Huxley said a word which should help to set the stratifiers straight when he wrote: "I sometimes wonder whether people who talk so freely about extirpating the unfit, ever dispassionately considered their own history. Surely one must be very 'fit' indeed not to know of an occasion, or perhaps two, in one's life when it would have been only too easy to qualify for a place among the unfit." (Evolution and Ethics).

(Concluded from page 159)

Appearance of fundus shows improvement. There is still a very finely striated area of hemorrhage at the macula, replacing the heavier one, and there is a slight suggestion of oedema in this region. There are a few other hemorrhages near the disk and some evidence of oedema.

X-Ray pictures of his head shows:

1. Peculiar shape of sella tursica.
2. Cloudy right frontal sinus—clear left.
3. Clear ethmoids and antrum.

(This picture was taken after first suction treatment for his nasal condition)—sinus still drawing pus.

Visual fields show no change in periphery.

Relative central scotoma is now passing.

Blind spot has returned to normal size.

O. D is normal as to fundus and fields.

Rhinologist is still getting pus.

Note blind spot is back to normal and there is no central scotoma or other defect.

O. D. V. 6/6—1.

O. S. V. 6/6. Sees slightly grayish.

O. S nerve still has fuzzy edges and the adjacent retina is slightly oedematous for about a half nerve head away. There is an old hemorrhage (still red—black center) about a nerve head away in line with the macula. Arteries still show broad peripheral and central reflex. Veins are full. No exudate or atrophic spots.

O. D. definite but slight interruption at crossings.

Patient did not return for further care but reported two months later that the condition had seemed to clear up entirely. He was advised to continue under the care of the Rhinologist until the conditions making possible the sinusitis had been eradicated thoroughly.

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cles in the anterior urethra will be found discharging pus. These follicles represent the mouths of long sinuducts which run deeply into the tissues of the corpus spongiosum and corpora cavernosa. They may run in different directions—now running parallel with the long axis of the urethra, and now encircling the urethra for a considerable distance. They are best treated—not by the fulgerating needle as advocated by some, for the needle cannot enter the entire length of the ducts, and if only the proximal end of the duct is destroyed, then the suppurative process will still continue in the deeper tissues—but by injecting them with solutions through a cannula, the cannula acting as dilator and conveying medication to the tissues at the same time. I had some time ago designed graduated sounds for the dilation of ducts in the urethra. As long as the mouths of the follicles are inflamed and discharge pus it is evident that the glands are in a state of suppuration and our primary object is to enhance drainage. If, on the other hand, there are cystic glands in the neighborhood of irritated ducts, they should be destroyed either by a knife or by the fulgerating needle. The solution used for urethral glands depends on their location. If they are situated either outside of or within the meatus, or a little behind in the navicular fossa, then a few drops of pure carbolic acid injected through a hypodermic syringe and immediately followed by alcohol, will often act marvelously in some cases; if on the other hand, they are situated farther down in the canal, then 3 per cent solution of silver nitrate injected through a specially designed cannula should be used instead. The follicles in the prostatic urethra, being more complex and labyrinthine in their structure, therefore, resist treatment for a longer time. The utricle should likewise be washed out.

The verumontana being constantly bathed in pus and inflamed from the irritating discharges issuing from the various ducts that enter into its substance, is very often abused by strong caustic solutions applied to its surface. The topical applications to the colliculous are an erroneous practice, for as long as the etiological factors are operative no more can be gained by such applications than by making similar applications to an inflamed ureter which is constantly bathed in pus from an infected kidney. But just as soon as the diseased kidney is removed, then the condition in the ureter heals with or without local treatment.

The treatment in the posterior urethra must follow the same principles as already laid down—to promote drainage. This is accomplished by dilations, by prostatic massage, by the application of heat to the prostate and to the prostatic urethra. With resorption of the inflammatory products of the prostate, drainage of the seminal vesicles is re-established, leading to a successful termination of the infection.

If on the other hand, it is reasonable to assume that the walls of the ejaculatory ducts are infiltrated and contracted, thus interfering with free drainage of the seminal vesicles, then they should be dilated by specially constructed bougies and sounds, and injected with 1 per cent silver solution, using enough of the solution to distend the seminal vesicles. Preliminary to the silver nitrate, thorium solution may be injected for radiographic studies of the vesicles. A good deal of knowledge may be gained by X-ray studies of the vesicles. The contour, the degree of distension, the position of the vesicles, whether favorable or not for drainage, and the time consumed for their emptying themselves should be noted carefully. After studying a fair number cases at the Metropolitan Hospital, we found that normally the vesicles rid themselves of their contents in from 24 to 48 hours. In cases with poor drainage they not only showed the opaque solution indefinitely, but became more distended and remained so for a long time.

When the case does not respond to this form of treatment, then the Belfield operation of a double vasotomy should be resorted to, leaving the needles in situ for a few days to a week, and injecting the vesicles every day with either 2 per cent silver nitrate solution, or any of the colloidal solutions of silver. It is well to strip the vesicles before each treatment and to X-ray them before and after each injection. The prostate, however, must not be neglected while the vesicles are treated. A large number of cases respond to this form of treatment.

Those who are not benefited by this treatment, must be subjected to a more radical operation, namely, that

of vesiculotomy and, possibly, a vesiculectomy with incision and drainage of the prostate. There is only one technique worth considering, and that is the one advocated by Young for perineal prostatectomy. Its advantages over the Fullers method are the direct visualization of the vesicles and prostate, the operator being in a position to judge by inspection, whether or not the vesicles be treated conservatively or more radically by removal. If the surgean has reasons to believe that drainage of the vesicles will remain imperfect, resulting in a vicious circle, then he may proceed with their enucleation.

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getics of the organism. A study of the human organism with the energetics omitted is as barren as would be a study of a mechanical power plant with the power left out. Our scientific Hottentot who did not get beyond the anatomy and physiology of a mechanical power plant would never get anywhere. The foot pound and the volt are not observable with the microscope. Some different kind of instrument is needed to study energy.

Chemical changes undoubtedly lie at the foundation of metabolism in general, but it is practically certain that the energetics of an organism involve many forms of energy which are not chemical at all, and forms which are wholly unknown to our present day science. By some means or other we must identify these forms of energy, the particular work performed by them, and what organs act as transformers for producing them. It is probable that practically every organ within the body is a transformer of some kind, or a part of such a transformer.

A good place to begin an attack upon this problem seems to be that indicated. We know that a muscle is a device for transforming an unknown form of energy into foot pounds, which are a known form. We are able to locate this unknown form as being stored ready for use in the muscle which it is to actuate. We are also able to determine some of its characteristics, the fact that it may be moved from its place of storage and used at some other place, and the fact that after it has been stored in a muscle for use at that place it may not only be moved to another place but may be changed over into some other form and be used for another purpose. Further analysis will reveal other characteristics and indicate tests by which it may be identified and means by which it may be measured. When it is remembered that a man without energy is dead and useless, it will be seen that a study of human energetics is an important thing.

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the apex of an arc. The whole adjustment is merely a demonstration of the possibilities of volitional control of the back muscles in these directions. There follows uniformly improved function in most of the organs by reason of enhanced mobility of the vertebrae.

The primitive movements hereafter to be described (in a later communication) are those found most capable of economically maintaining and regaining normal action in: (1) the thoracic, (2) the abdominal, (3) the legs and arms, (4) the trunk, back and neck.

How to Overcome Disuse Cripplings

Obviously the one cure for disuse is right use. For the crippled parts to move or to be moved is of course uncomfortable, often painful. Most persons, and all old persons, welcome any excuse to disuse their voluntary muscles. Hence arise dominant errors, wishful thought beliefs, traditions, folkways, reflected through false mental reactions whereby the impression prevails that stiff, painful joints—oftener the associated structures—should not be moved but kept tenderly at rest. So also of "heart disease," which until recent lucidities or "changes of heart" have come upon a small and thinking group of physicians, it was dogmatically taught that just the contrary, viz: prolonged disuse is necessary. Now the elect have learned that the disused and disordered muscles and some forms of diseased hearts, must be retrained through varied and persistent work.

Stagnation being the prime cause for deterioration in direct and associated structures must be overcome or deterioration must inevitably follow, not only locally but throughout the organism as a whole. Next comes the problem: what kind of use, how much use and precisely the kind of use is most desirable? Here and now it is only possible to touch upon the highest points. I have elaborated the subject for a second paper.

Suffice it to say here: expert guidance is needed and throughout the period of disability; also until the recovery of structure and right habits is reached. The nature and aims of movements found most effectual, and those through which we reacquire conditioned reflexes; those which come through training, association of motor impulses, performances, proficiencies. They should be precise, complete, poised, graded, in order to get hold of one's self, to remaster motor functions and restore tone to structures and fluids. This is the only way to get radical and permanent results. Any loose, casual, timid or lazy potterings, while better than total stagnation, prove disappointing. In the enterprise not only zest but judgment and art are needed. Disqualified, injured, diseased, partly paralysed or crippled parts should be held in advantageous positions by the operator, supported, steadied, directed, encouraged. Only thus is it possible often to secure any movement. It is necessary to place an impaired part in positions of advantage before it can perform well, in accord with its shape, function and design. Many a part condemned as "paralysed" is merely unable to work against an overwhelming load. The load must be put to one side by associated helps—then the part will work.

After the impaired parts become once more under control of the directing mind then, and rarely till then, can the movements become nicely co-ordinated and a return of automatics achieved.

Summary

The chief point in teaching educative movement is to begin with the simpler and proceed to the more complex. This is a paramount dictum. The young child or adolescent may be deficient in development, may be lacking in energy, even defective in heart power and yet be quite capable of performance when urged and directed skillfully and judiciously.

The mature adult has always neglected more or less so to perform the full cycle of natural movements as to have become incapable of doing so. The reasons are in part foregetfulness, in part disinclination, and in part loss of capability through disuse. This incapacity is, as pointed out, due to varying degrees of stiffness, adhesions between structures designed to slide one over the other, also to contractures and joint deteriorations.

Since the muscles are endowed with an intelligence (Sensori-motor consciousness) all their own, there is motor memory and likewise oblivion. They need awakening, encouragement, guidance. Muscles also sleep. Note one's own early waking or post dormitial experiences. Sometimes after a deep sleep the muscles remain torpid, lethargic, long after the mind is fully awake, alert, cerebrating clearly. Sometimes on the other hand the

muscles keep awake, alert, while the mind is cruelly drowsy. This contrast of muscle sleep with mind sleep is explainable on the ground of the two forms of consciousness, the cellular on the one hand and the cerebral on the other. Note the sleepwalker, mind asleep, body awake.

Forms and Methods of Performance. Briefly the best forms to begin with are lying upon the bed, floor or grass. These will be seen done spontaneously by primitive peoples, indians, negroes, and such; it is a luxurious putting to work and giving play to muscles after a deep slumber. As a matter of fact every one, young or old, should perform these "post dormitial" tensions, flexions, bendings and torsions; and do them to the limit of excursus, ambit, sweep of movement. Thus one can keep fit at small outlay of effort.

Next come the large, varied, and eminently valuable, as well as interesting, absorbing, outdoor activities from gardening, croquet, tether ball, volley ball, battle dore and shuttle cock, bowls, up to golf and even bat and ball, as far as one is willing—anyone not permanently crippled is able—to go.

Finally one safe aphorism: vastly more harm can be done and is done by rusting out than by over-doing.

Public Health

Tuberculosis Claimed 5,794 Victims in New York City During 1922

Tuberculosis, in all its various forms, claimed 5,794 victims in New York City during 1922. The death rate per 100,000 inhabitants was 99. It is the first time in the history of New York City that a tuberculosis death rate below 100 has been reached. In 1921 the mortality rate was 103. There has therefore been a decrease of 4 per cent. The continued gain against the disease—even though but slight—has taken place while the general death rate during 1922 in this city was going up by 6 per cent. Tuberculosis in 1922 caused 128 fewer deaths than in 1921, when they totaled 5,922.

In 1910, tuberculosis caused 13 per cent. of all the deaths occurring in New York City. In 1922, the percentage due to tuberlocusis was reduced to 8 per cent.

Up to 1919, the annual number of deaths from tuberculosis of all forms was constantly close to, or slightly over, 10,000. The great gain of the past few years is better realized when we see this total now maintained below 6,000. Since 1910 the population of the city has increased by well over a million people. The intensity and congestion of life have naturaly increased at the same time. If the mortality from tuberculosis in 1910, which was then at the rate of 210 per 100,000 inhabitants, had prevailed las year, we should have had to register 12,263 deaths from tuberculosis, whereas they actually numbered but 5,794. The saving of lives due to the progress against the disease, therefore, amounted in this city to 6,469 during 1922 alone.

Tuberculosis of the pulmonary type, popularity called "consupmption," caused 5,035 deaths in 1922. Tuberculosis of other forms than pulmonary—namely, that of the glands, bones and meningeal forms which are mostly confined to children—caused 759 deaths last year as against 779 in 1921. The low death rate from tuberculosis of this type, which is now down to 13 per 100,000 population, has been reached and maintained only since the general pasteurization of milk began a few years ago. It must be recalled that this type of tuberculosis in other countries where such pasteurization is not enforced prevails at rates two to three times that of New York City. The number of deaths from tuberculosis of all forms in the remainder of New York State, exclusive of New York City, totaled, up to December 1, 4,359 as against 4,412 during the same period in 1921. The "up State" population, now estimated at 4,811,103, contains all of the rural sections of the State, and it has been slightly decreasing owing to the trend towards cities. The 1922 tuberculosis mortality "up State"—which, for the first eleven months of the year, was at the rate of 98.8 per 100,000 population—will probably indicate a reduction of only 1 per cent. during the past year.

The Metropolitan Life Insurance Company's experience, which is based upon observation of some twenty millions of people scattered all over the United States and Canada, mostly in cities, shows a reduction in their tuberculosis death rate of 3 per cent. during 1922. In 1921, the death rate from all forms of tuberculosis of Metropolitan Life policy holders was 117, whereas in 1922 it was 113.

The Federal Department of Commerce Weekly Health Index states that its summary of causes of death in forty-three cities shows a mortality rate from all forms of tuberculosis of 99.7 during 1922 as against 104.5 in 1921.

With a reduction in the tuberculosis mortality in New York City of 53 per cent. since 1910 alone, it may well be asked whether it is necessary to alter the apparently present successful program of defense and attack against the White Plague. But the tendency of the mortality rate not to fall any more, and the presence in the city of over 25,000 sufferers from this disease, demand the exploration and addition of new methods to deal, if possible, a final blow to this social scourge. The main avenues of attack naturally remain as before—in popular education, in the continued use of the dispensaries and of home supervision of tuberculosis, in segregation or advanced cases in hospitals and in the following of modern treatment in sanatoria. These methods must continue to be utilized. But it is possible that the taking of the following three steps would almost give a death blow to tuberculosis, namely:

First, the pasteurization not only of milk but of all dairy products so as to remove the whole souce of bovine infection in children. The products to be pasteurized are in much commoner use than is realized, as they include cream, butter, cheese and the many varieties of ice cream.

Second, the very marked success of nutrition classes in building up the health of under-weight children should warrant their extension in the schools to all children found under-nourished. The raising of a generation all physically sound and resistant would practically harden all possible ground in the future against the development of any tuberculosis seed.

Third, the establishment of industrial health services by autituberculosis institutions, especially dispensaries, and bv other health agencies, should break down the last stronghold of tuberculosis among workers, whether men or women.

But the development of these specific measures should not blind us to our duties and opportunities in supporting measures making for the general improvement of social and economic conditions of life.—(*Bull. N. Y. T. B. Assn.*)

Ten Points in Cancer

In the State of Maine cancer work is carried out through the Cancer Division of the Maine Public Health Association under the Chairmanship of Dr. E. H. Risley, of Waterville, who is also Chairman of the Cancer Control Committee of the Maine Medical Association.

The co-ordination of the health work in this State through the Public Health Association has made it possible for Dr. Risley to utilize several of the State agencies represented in the Association such as the State Federation of Labor, the State Federation of Women's Clubs, the State Grange and the State Nurses' Association. Through these bodies the lecture work in Maine has been greatly increased during the past year, when some 2,000 comparatively small audience were addressed, most of them during the National Cancer Week when over 93,000 pesons heard the cancer control message from his corps of lecturers.

The Public Health Association has issued a pamphlet entitled "The Ten Books," or "How To Keep Well" in which the ten essentials in the program of each of its Divisions are epitomized. That under Cancer written by Dr. Risley is as follows:

1. Cancer is not contagious and it is not hereditary.
2. Cancer may develop from any lump or swelling on or beneath the surface of the skin not otherwise easily explained. A wart or mole that shows signs of irritation or rapid growth may be cancerous.
3. Cancer may arise in any part of the body as a result of a constant irritation. A ragged tooth or a poorly fitting dental plate which irritates the tongue or mouth may cause cancer; or a poorly fitting corset may cause cancer of the breast.
4. Cancer is practically always curable if it is discovered and removed in its very early stages. Delay in the discovery and in the proper treatment of cancer causes thousands of preventable deaths.
5. People often do not consult a physician as soon as they notice any abnormal condition of the body, owing to a foolish fear of talking about such a condition with the doctor or with their family.
6. There is seldom any pain in the beginning of cancer. If you wait to feel pain from a cancerous growth, it probably will be too late to save your life.
7. Operation to remove a cancerous growth in its very early stages is a simple matter with very little, if any danger.
8. There were 938 deaths from cancer in Maine in 1920 as compared with 526 in 1900. The tuberculosis death rate, on

the other hand, has been reduced more than half. Cancer also can be checked with your help.

9. A thorough medical examination of all our people once a year would probably cut the deaths from cancer in half.
10. If you suspect that some abnormal condition of your body is cancert, act at once. Do not worry, but remember that prompt action may save your life.

Public Cancer Education Through the Press

Through the activities of J. C. Campbell, M.D., Chairman of the Cancer Commission of the Medical Association of Georgia, the Atlanta *Journal* has been carrying a weekly article on six successive Sundays devoted to some particular phase of the cancer problem. The first article was as follows:

"During the past few weeks the American Society for the Control of Cancer and medical organizations all over the country have been trying to give the public such facts as will enable the laity to recognize cancer in its early and curable stage.

"The term cancer is derived from a Greek word meaning a crab, because it was supposed to have roots spreading out in all directions like the claws of a crab.

"Since the earliest time the composition of the body has been an object of investigation by scientific men. Hippocrates and Galen taught that it was made up of four fluids blended in definite proportions. An excess of one or another of the fluids caused disease; especially was this true of cancer. It was believed that a slow-growing cancer was caused by an accumulation of 'yellow bile.' A rapid-growing or 'eating' cancer was due to 'black bile.' This theory prevailed without dispute until well into the sixteenth century.

"The first quarter of the nineteenth century had passed before the true nature of animal tissue was discovered and it was demonstrated that the body as a whole was made of separate units called cells, juts as a building is made up of separate units—bricks, stones, etc.

"All the tissues of the body arise from a single cell called an ovum, made capable of growth by fertilization. Within a few hours after fertilization the ovum has divided into a group of cells which begin to assume different shapes and tasks. To one is assigned the duty of forming the brain, to another the liver, and to another the heart, and so on until every cell is employed. They work in harmony under a law established by nature. Each organ assumes a definite size and shape and is prepared to perform a definite function, so that at birth the completed body is presented to the world 'with all the characteristics of the species to which the primitive cells belonged and many of the peculiarities of the parents from which it sprang.' In the unborn or embryonic body, cell development is rapid and is characterized by certain peculiarities, many of which are found in cancer cells; these characteristics, however, are lost shortly after birth.

"A knowledge of the above facts is necessary before we can understand: First, that a cancer is simply a new growth of cells arising from some organ or part of the body; second, the cells of which this new growth is composed have reverted to the embryonic type; third, they have lost their relation to the laws of nature; so that, fourth, they grow wildly into the surrounding structure, penetrate the veins and lymph vessels, and are carried to distant parts of the body, forming secondary growths, metasases.

"The cells forming a cancer are outlaws, because they refuse to obey the laws of nature and remain within their normal sphere and perform their normal function. Like an uprising in society, the start is local and, if properly eradicated, may be cured, but, if allowed to spread, will soon become unmanageable.

"Although the most brilliant minds in the world are engaged in research and millions of dollars are being spent annually, the cause of cancer has not yet been definitely discovered. A great deal has been found out about it and we know how to cure it when an early diagnosis is made. No one can cure a late cancer—the only hope is to have competent professional care early.

"There are many kinds of cells in the adult body and all cancers do not arise from the same kind of cells; therefore, they are not all the same and do not react alike to remedies. The treatment that will cure one even in the early stages, may only hasten the growth of another. A careful study of the cells must be made before the proper treatment can be administered. Any one suspicious of having a cancer should see the family physician, who will give the proper advice."

Vaccination Is 2,000 Years Old

"Vaccination is an outgrowth of man's effort to protect himself from pestilence by using nature's methods of defense," says Dr. G. W. McCoy, director of the Hygienic Laboratory of the U. S. Public Health Service. "Primitive man noticed that recovery from a first attack by most diseases gave immunity against other attacks; and some 2,000 years ago he began to inoculate his fellows with smallpox when conditions seemed propitious instead of wating for nature to do it at some time when conditions might be very unpropitious.

"Inoculations against smallpox were made in India and in China as early as 300 B. C. Later, when the disease reached Europe, inoculation went with it, supplemented by a new method called 'selling smallpox'—exposing a well person to contact with one ill with the disease so that if he survived he would be proof against it.

"Inoculation differs somewhat from vaccination as devised by Jenner, but the principle is the same. Moreover, long before Jenner's day it was known that an attack of cowpox gave immunity from smallpox; and records show that men who had recovered from cowpox had themselves inoculated with smallpox to make the proof conclusive. Jenner, however, as he himself says, 'placed vaccination on a rock' where he knew it would be immovable.

"Before the days of vaccination conservative estimates show that one-third of all persons had smallpox and one-tenth of all deaths were due to it. Today smallpox is rare; many physicians have never seen a case; and, where vaccination is consistently practiced no deaths from it occur. Formerly smallpox was considered a children's disease; and it still is a child's disease—where infantile and school vaccination is neglected. Witness the Philippines, where four or five years ago, after years of neglect of vaccination, an epidemic swept away nearly 50,000 persons, a large percentage of whom were children under ten years of age.

"In the United States, well-vaccinated communities show low smallpox rates—Maryland with one-tenth case per thousand population; New York with one-fortieth per thousand, and the District of Columbia with 0.14 per thousand. Poorly vacinnated States tell another story: Oregon with 1.45; Washington with 1.72; and Kansas with 2.0 per thousand population.

"Some communities wait till an epidemic breaks out and then rush to vaccinate. These stop the disease—after it has caused many deaths and has 'branded' many survivors. Sixteen months ago, in Kansas City, an epidemic of smallpox began, yielding 350 cases and 123 deaths; and a few months later another started in Denver and yielded 950 cases and 288 deaths. Such epidemics always end the opposition to vaccination in the community—for a time."

Diphtheria in City and Country

In New England, at least, the susceptibility to diphtheria is higher among persons living in sparsely settled or rural regions than it is among those living in cities; and it is much higher among the well-to-do than among the poor, and among the native born than among the foreign born. Such are the conclusions reached by Dr. C. W. Kidder, of the U. S. Public Health Service, after an investigation, recently completed, in the Eighth Sanitary District of Vermont, which has a population of 35,000.

The Shick test was administered to a little more than 2,000 teachers and school children whose parents requested it. Of these about 1,500 were found to be susceptible to the disease; and their ammunization with toxin-antitoxin was at once begun.

As physicians know, the Shick test is made by injecting a tiny amount of diluted diphtheria toxin beneath the outer skin layer of the forearm. If the person is immune to diphtheria, that is to say, if his blood contains substances that neutralize the toxin that is injected, nothing results. But if his blood does not contain such substances a small rosy spot soon appears at the point of injection and persists for a few days. It causes little or no discomfort.

The value of the Schick test lies in its pointing out those who are susceptible to the disease and in thus enabling them to be immunized by toxin-antitoxin before an epidemic breaks out. It also enables those who are not susceptible (estimated as being from 20 to 30 per cent. of children and 35 to 50 per cent. of adults) to save the expense of immunization either before or during an epidemic. This is the second great step in the fight against diphtheria, the first being the introduction of diphtheria antitoxin, which came into general use about the beginning of the century, and which caused the diphtheria rate to drop from 43.3 per hundred thousand of the population in 1900 to 15.3 per hundred thousand in 1920, the latest year for which figures are available.

Notwithstanding the distances to be covered and the relatively high cost and difficulties of such work in rural districts, the value of the Shick test and of the toxin-antitoxin immunization, adds the Public Health Service, is so great that it should be included at all appropriate times in the programs of health departments. Particularly should this be done in rural regions, where the degree of susceptibility to the disease is greatest and where facilities for prompt and adequate treatment are most frequently lacking.—(*Weekly Bull.*, N. Y. Dept. Health.)